Coal Age

JUNE, 1953

A McGRAW-HILL PUBLICATION — PRICE 60¢

Thin-Seam Stripping

How Power Coal teams high-capacity units to strip and clean 3,000 tpd from a 20-in seam. p 78

Mining Long Faces

Mobile equipment in 315-ft faces concentrates operations for high output in 36-in seam at Ben Hur Coal. p 84

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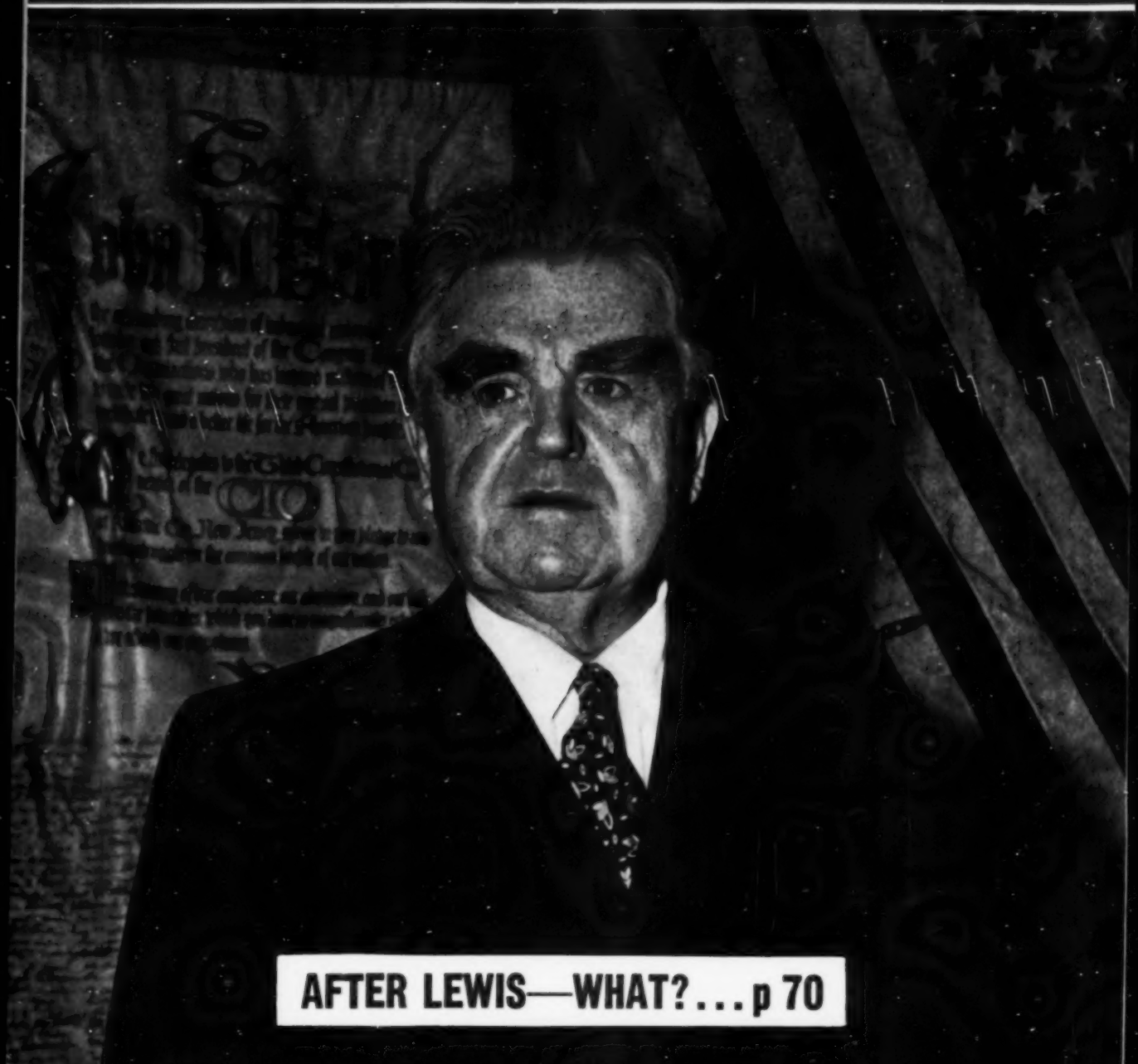

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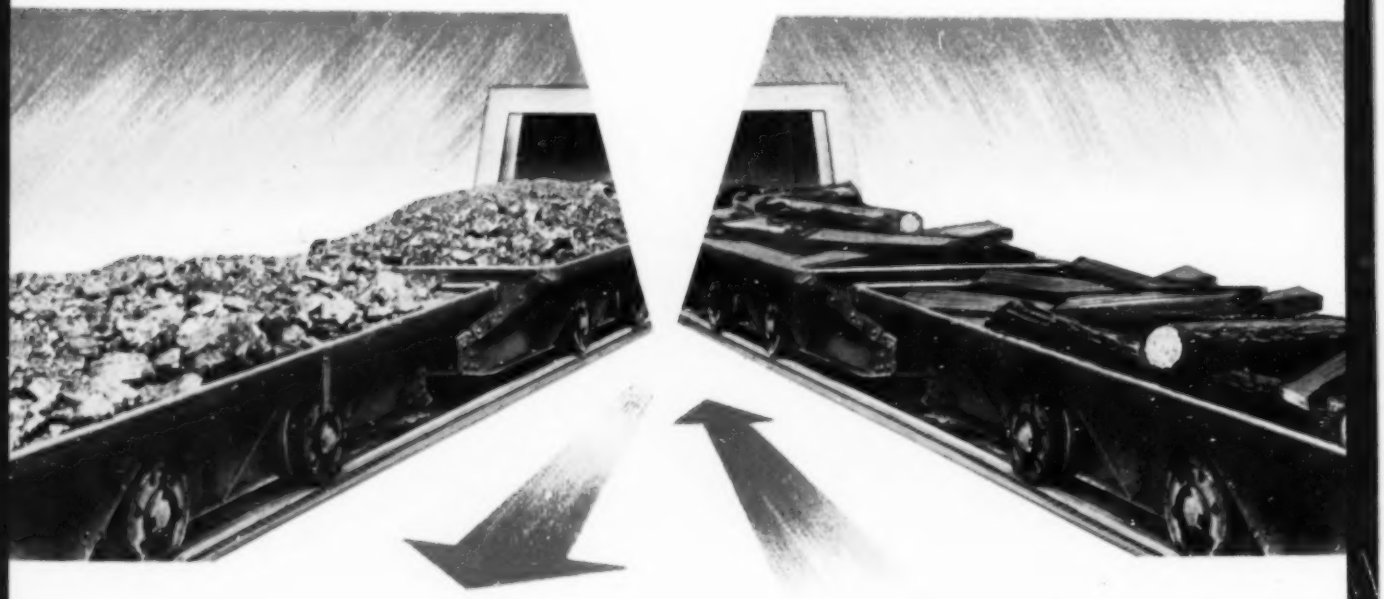
the case of the

SPLIT PERSONALITY



Sometimes split personalities pay off by letting you do twice as much work. It's that way with A.C.F. Mine Cars. They work twice as hard. *Going in,* they transport men and supplies cheaply and safely . . . *coming out* they haul record loads in record time.

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RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

B. F. Goodrich cord belt cushions the shock of crashing coal

2 to 6 times the impact resistance of fabric belts

EVERY day hundreds of tons of coal crash down on that belt. Engineers knew an ordinary belt couldn't stand such abuse, so a Caricoal *cord* belt, developed by B. F. Goodrich, was installed. It's already lasted 10 years—old age in this type of service.

This is typical, not an unusual case at all, because the B. F. Goodrich Caricoal cord belt was designed to stand more impact, and so lasts longer. An extra cushion is built into both the top and bottom of the belt. This cushion is a ply of parallel cords running lengthwise. Each cord is completely surrounded by rubber—no cross threads tie them together—so they are free to give as heavy chunks of coal strike the belt. The rubber takes the shock.

As an extra protection against shock and impact, B. F. Goodrich has added a patented *Transcord Breaker*. This extra layer of parallel cords in rubber is placed across belt width and around belt edges. Increases adhesion of cover to carcass by 50%. Keeps cover from tearing off carcass under severe impact. Prevents gouges and cuts from splitting belt cover.

If your belt must take severe impact on loading, and cutting and gouging at the loading chute, you need a Caricoal cord belt. Your nearby B. F. Goodrich distributor can show you how these longer-lasting coal handling belts can cut costs, or write *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

Caricoal Conveyor Belts

BY

B.F.Goodrich

RUBBER FOR INDUSTRY

WHERE *Specialized*

Behold the brave Swiss Alpine guide who takes the dizzy crags in stride and with ease and dexterity scales heights too steep for you and me. At his day's work we're not surprised . . . you see, his skill is *specialized*.

SKILL REALLY COUNTS...

...and deep in your mine is ANOTHER place

The Peak of perfection for coal mine lubrication *is*

Hulburt Quality GREASE

It may look like a long climb out of the red when your mining machines are suffering from faulty lubrication. But if you let a skilled specialist—a Hulburt Engineer—go down into your mine and guide you as to proper lubrication methods with specialized Hulburt Quality Grease—you needn't be surprised at the results you'll get. Ask any really experienced Hulburt user.

HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PA.

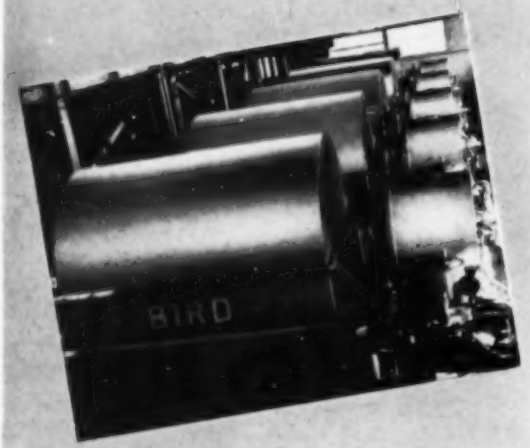
Specialists in Coal Mine Lubrication

NEW WAYS TO LICK THESE OLD PREPARATION PROBLEMS

1.

How to get that 3/8" and finer coal drier and of uniformly better quality

With the BIRD COAL FILTER the fine, high ash particles can be separated from the clean coal, reducing its moisture content as much as 50% and lowering ash content, too.



2.

How to polish up that coal cleaning water so it can be continuously re-circulated without the nuisance of sludge ponds or stream pollution

With the BIRD "POLISHER" and a simple system for flocculating the fine particles, including colloidal size clay, the water becomes clear and the slimes are delivered to a refuse belt; no more waste — no more disposal problems.

Want the details on exactly how it's done and how little it costs? Get in touch with

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Coal Age

JUNE • 1953

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THIS MONTH'S COVER

JOHN L. LEWIS, one of the most photogenic men in public life, has many moods, some of which are shown in this cover shot and in the photos on pp 70 and 72. Whether he's contending with opponents across the bargaining table or quoting Shakespeare for the benefit of newspaper reporters, his personal impact on the coal industry is known to all. But what will happen when he bows out as head of the UMWA no one can say. In our lead-off feature this month (p 70), *Coal Age* probes the implications of Mr. Lewis' eventual retirement, the background of his possible successors, and what operating men can do to cushion the transfer of power—all topics that merit thoughtful consideration. (Cover photo by Wide World.)

COMING IN COAL AGE

Cost-Cutting materials and equipment that will help you slice mining costs, and how other mines are using them, will be detailed in another *Coal Age* Special report . . . in next month's issue.

Pillar-Mining Team—How Jamison Coal & Coke uses a continuous miner, pickup loader and crawler-mounted shuttle car to economically recover pillars, in spite of tough mining conditions.

Augering supplements stripping at the large-scale operations of the Keeley Construction Co., near Clarksburg, W. Va., where a high-capacity auger follows up mining of a 75-foot highwall.

Aluminum shaking conveyor, a new-type lightweight unit, proves itself with greater mining efficiency, easier handling and high corrosion resistance at an anthracite property.

How Sterling Coal looks to the future, in modernizing its No. 1 mine, streamlining mining methods and mechanizing production and service operations.

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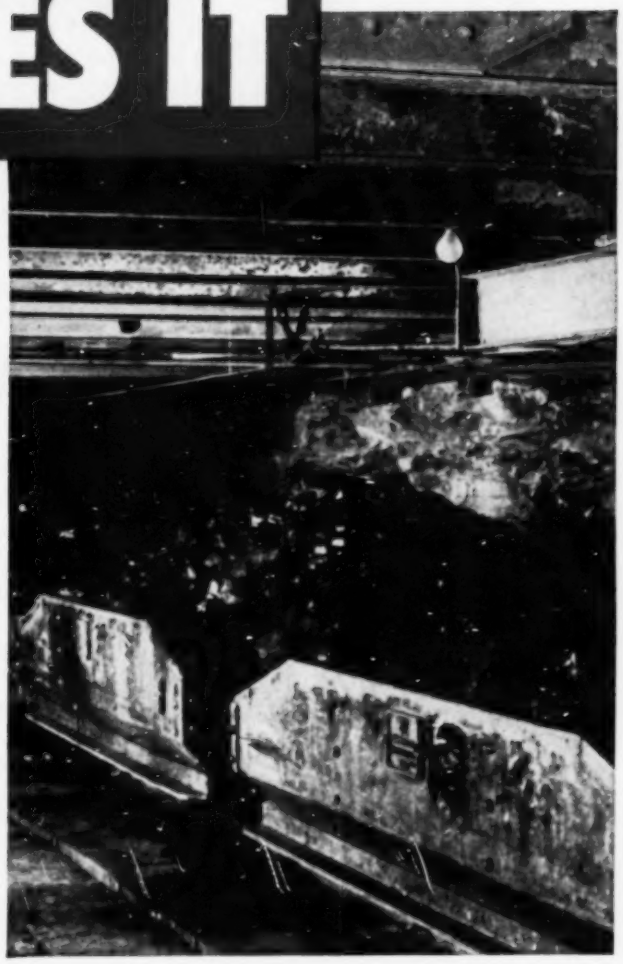

SUMMER, winter — any time of year — mine cars lubricated with *Texaco Olympian Grease* start easier and run smoother. That's because *Texaco Olympian Grease stays in the bearings* — plain, cavity hub or anti-friction. You get longer lasting protection against dirt, moisture and wear.

Texaco Olympian Grease effectively resists oxidation, and will not separate in use or in storage. The extra protection it gives means extra life for your bearings and lower maintenance costs for you. There are three consistencies to meet every requirement. All are easy to apply.

For high-speed, grease-lubricated ball and roller bearings, use *Texaco Regal Starfak* — the premium-quality lubricant that assures longer lasting protection against wear and rust. You'll get longer bearing life, cut your maintenance costs.

Call in a Texaco Lubrication Engineer and let him help you increase efficiency and reduce costs through effective lubrication. Just contact the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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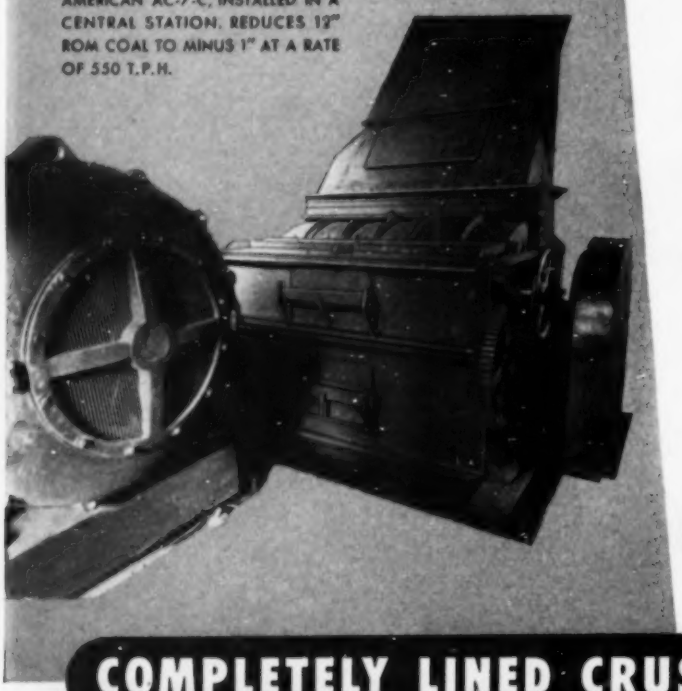
LUBRICANTS for the Coal Mining Industry

Check *American* Quality—Feature by Feature—and you'll know

AMERICAN AC-7-C, INSTALLED IN A CENTRAL STATION, REDUCES 12" ROM COAL TO MINUS 1" AT A RATE OF 550 T.P.H.



WHY AMERICAN CRUSHERS can reduce coal for less than

per ton

AMERICAN Feature No. 3

COMPLETELY LINED CRUSHING CHAMBER

LOOK INSIDE—before you decide on a crusher. There's the place to check for unstinted quality—the place to look for future performance potential.

Look inside an AMERICAN CRUSHER. There, for example, you'll find the American-designed chamber liner — thick punish-taking plates which completely line the crushing chamber . . . sectional for easy plate-at-a-time replacement . . . engineered to offer *lifetime* protection to the vital frame and housing structures.

This liner, plus the all-manganese steel shredder rings, breaker plate and grinding plate explain why the rugged work area of every American Crusher operates on such low maintenance costs . . . why Americans stay on the job year after year—as top performers!

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PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

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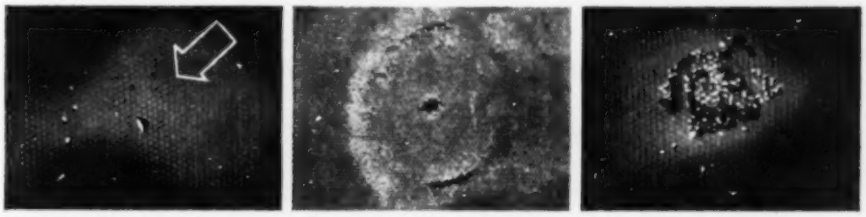
Look What You Don't get with Goodyear Conveyor Belts

TYPICAL MILDEW GROWTH



A Underside of cover showing cuts where moisture enters and promotes growth

B Top ply of belt showing typical, advanced mildew growth

C Second ply showing advance of mildew through plies

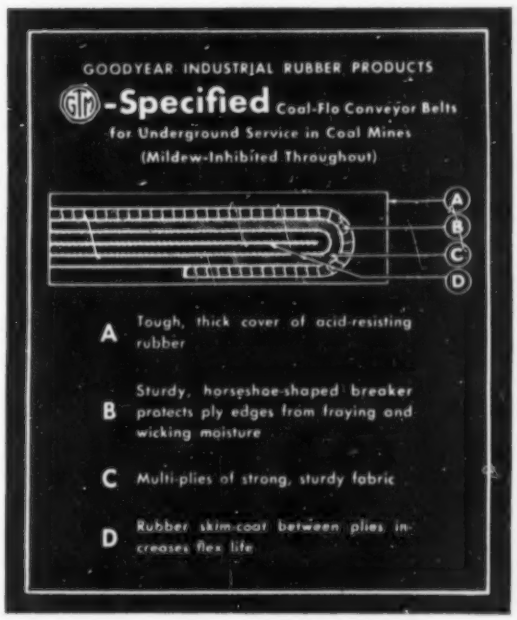
"STOP mildew and you stop a major cause of premature belt failure"—so the G.T.M.—Goodyear Technical Man—has maintained for almost 30 years. And, he can prove his point with thousands of tests and actual installations the world over.

Mildew is the No. 1 "under-the-cover" killer of belts. Mildew created "rot" of the fabric, load-carrying, tension member causes fasteners to pull out, "mushy spots" to develop and circular plugs to drop from the belt.

How mildew works—Exposed fabric at the fastened ends and tiny cuts in the belt cover let in moisture which activates the mildew spores. Aided by darkness and lack of ventilation, the fungus grows and weakens the fabric plies. Incipient crescent-shaped breaks soon develop and the belt fails long before it should.

How to avoid mildew—Stop it before it starts! G.T.M.-specified Coal-Flo belts are all made with high tensile covers, rubber skim coats between plies, and are mildew-inhibited throughout. A fungicide—proved by almost 30 years of use—protects Goodyear Conveyor Belts against attack from every type mildew.

See your G.T.M.—Get the full mildew story and assure yourself of normal belt life. Contact him through your Goodyear Distributor or write to Goodyear, Mechanical Goods Div., Akron 16, Ohio.


GOODYEAR INDUSTRIAL RUBBER PRODUCTS
GTM-Specified Coal-Flo Conveyor Belts
for Underground Service in Coal Mines
(Mildew-Inhibited Throughout)
A
B
C
D
A Tough, thick cover of acid-resisting rubber
B Sturdy, horseshoe-shaped breaker protects ply edges from fraying and wicking moisture
C Multi-plies of strong, sturdy fabric
D Rubber skim-coat between plies increases flex life

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing, Tank Lining, Rubber-Covered Rolls. Look for him in your Telephone Directory under "Rubber Products" or "Rubber Goods."*

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Carboloy Mining Maintenance

The most complete handbook in the industry to help you maintain, conserve and order carbide mining tools

Shows latest sharpening methods

Manual section contains 9 pages of detailed instructions and illustrations for sharpening carbide mining tools. Tells what grinding equipment to use and how to use it.

Makes tool ordering easier

Mining catalog section gives design advantages, easy-to-use tables with specifications and order numbers for each Carboloy Mining Tool. Also includes price list.

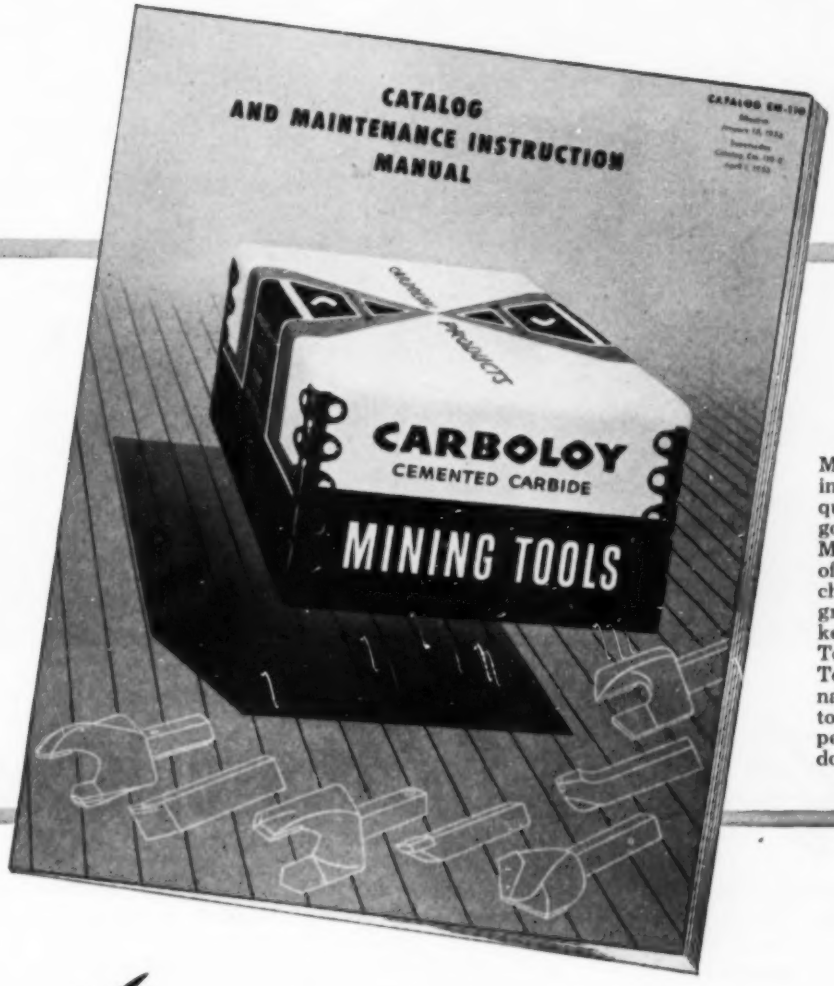
Describes modern Carboloy facilities

Manufacturing and research section, eight pages in full color, describes the modern Carboloy research and production facilities that make possible mass-produced quality products at low cost.

Describes free Carboloy services

Supplementary services section explains the Carboloy 3-Point Program for getting maximum efficiency from your mining tools. Lists other free Carboloy services and Authorized Carboloy Mining Tool Distributors.

Tool Catalog and Instruction Manual



More than 25 years' experience in the manufacture of high-quality cemented carbides has gone into making Carboloy Mining Tools. A rigid program of 29 individual quality control checks provides the high degree of uniformity that is the keynote of Carboloy quality. Tool up with Carboloy Mining Tools now, and see how tonnage quickly increases; how tools stay sharp for extra long periods of operation; how downtime is sharply reduced.

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Colitz Coal Co. replaces

To uncover vertical anthracite veins near New Philadelphia, Pennsylvania, Colitz Coal Co., Inc., Pottsville, is stripping 350 ft. of dirt and rock under really tough conditions. Overburden, largely conglomerate rock, weighs from 2670 to 3400 lbs. per cubic yard. Haul of 1000′ to spoil pile is all uphill, with grades averaging 20%. Haul roads are rough and contain a series of 90° switchbacks. "This is considered one of the toughest jobs in the region," says Co-Owner John Colitz. "It's *all* grades."

To lick such grueling conditions, Colitz Coal Co. purchased 3 big 50-ton "A" Tournarockers. After a year's operation with these giant Rear-Dumps they report output like this:

Move 40 to 51-ton loads up 20% grades

Loaded by a 6-yd. shovel, Tournarockers get an average yield of 30 cu. yards per load, according to company records. On a weight basis, that's 40 to 51 tons per load, depending on the material. In good weather and bad, the year around, the Colitz rigs keep hauling these big loads up the 20% incline — 7½ hours per shift, 3 shifts per day, 6 days per week. Says Mr. Colitz, "We make as high as 50 trips per shift on this steep cycle. If we didn't have these 3 Tournarockers, we'd have to use 10 other haulers."

Tournarocker's simplicity of design and unusual maneuverability give Colitz Brothers other valuable savings, too. Maintenance crews report these rigs can be completely greased in 2 hours (as compared with an entire 8-hour shift required to grease competitive trucks). Also, Tournarockers are able to get around sharp right-angle cutbacks without backing for a second try — something other rigs could never do. With 90° power steer, fingertip electric controls, and 4-wheel, multi-disc air brakes, Tournarockers

R.G. LeTOURNEAU LET EQUIPMENT

HIGH-SPEED • HAULING • EXCAVATING • LIFTING EQUIPMENT

Tournarocker dumps load clean over bank, needs no dozer clean-up. Front-wheel drive, multi-disc 4-wheel air brakes (with 9408 sq. in. total braking surface) assure perfect safety.

Giant 50-ton Tournarocker is loaded with 40 to 50 tons of blasted conglomerate rock by 6-yd. shovel. 13' x 17' bowl target speeds shovel swings, reduces spillage.

10 trucks with 3 Tournarockers

get under the shovel faster . . . position for dumping faster . . . and return to shovel faster.

"Cut operating costs 40%"

With performance like this, Colitz has assigned most of his hauling work to the Tournarockers . . . uses the four 12 and 15-ton trucks remaining from his earlier haul fleet for emergencies only. Company records show that 95% to 98% of total overburden moved in the past year was hauled by the 3 Tournarockers. *"Costs are low, too,"* says Mr. Colitz. *"Since using Tournarockers, we've cut operating costs by 40%!"*

Whenever *you* have rock, ore, or other shovel-loaded material to haul, it will pay you to compare your present output with that reported by Tournarocker owners. Ask your LeTourneau Distributor for complete facts on Tournarockers. There's a size to fit your needs — 9 to 50 tons.

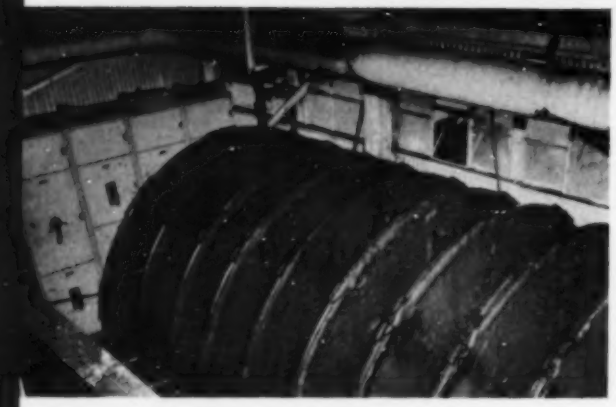
Tournarocker—Trademark Reg. U. S. Pat. Off. AR-301-CM

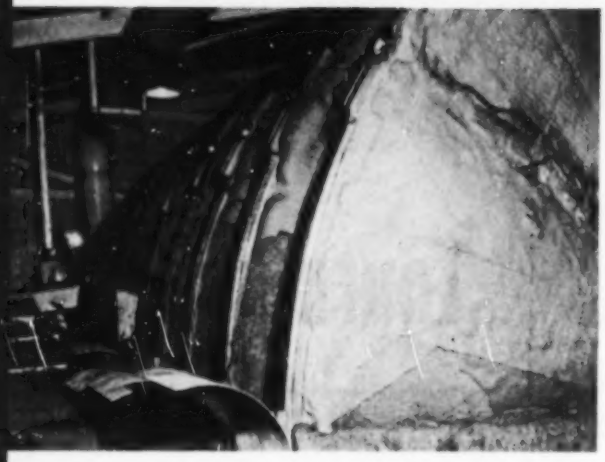
Loaded with 30 yds. of overburden, rig starts 1000' haul up continuous 20% grade. Return is made down same grade. With power steer through geared kingpin, these 50-ton units can turn around in a radius of 15'6" — less than half their 36' overall length.

R. G. LeTOURNEAU, INC.

Peoria, Illinois

EIMCO AGIDISC FILTERS FOR DEWATERING FINE COAL





Installations of Eimco Agidisc Filters in coal washing plants have shown that they will definitely increase general plant operation and provide an overall lower moisture content of saleable fines.

Check the following advantages:

1. **Reduced moisture content.**
2. **Clear filtrate produced in accordance with allowable solids permitted under existing anti-pollution laws.**
3. **Uniform cake — evenly dried.**
4. **Greater tonnage per sq. ft. of filter area.**
5. **Pay for itself in a short period by permitting a greater percentage of produced coal to find its way to market.**

Eimco Agidisc filters are helping improve the operation of many coal working plants. Write for information on Eimco Agidisc filters for your washing plant.

EIMCO 1453

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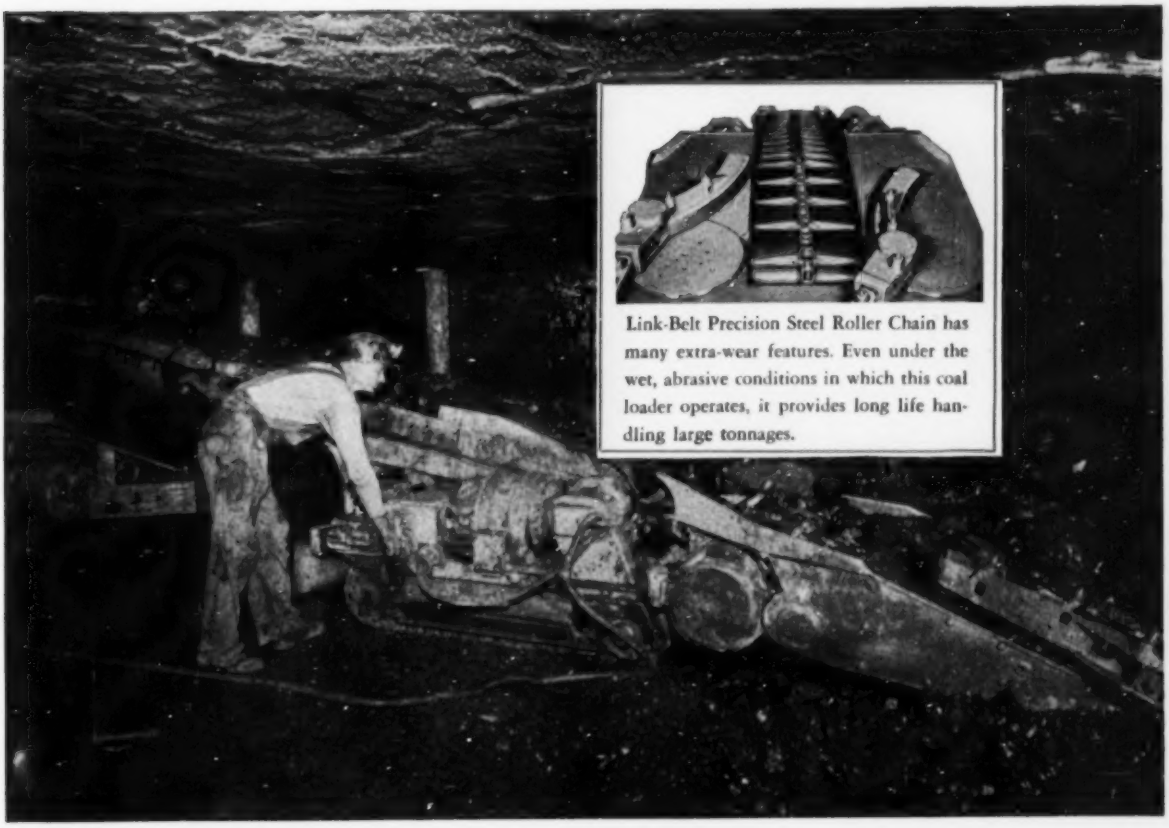
Write for information on the size and shipping address for samples.

Experienced laboratory technologists, trained in the practical application of vacuum filtration to washing plants will be glad to consult with you or your research engineering firm.

Laboratory size test units are also available on a rental basis and may be shipped to your plant for test work.



Link-Belt Precision Steel Roller Chain has many extra-wear features. Even under the wet, abrasive conditions in which this coal loader operates, it provides long life handling large tonnages.

What is the right chain for your drive or conveying job?

Typical chains from the complete LINK-BELT line

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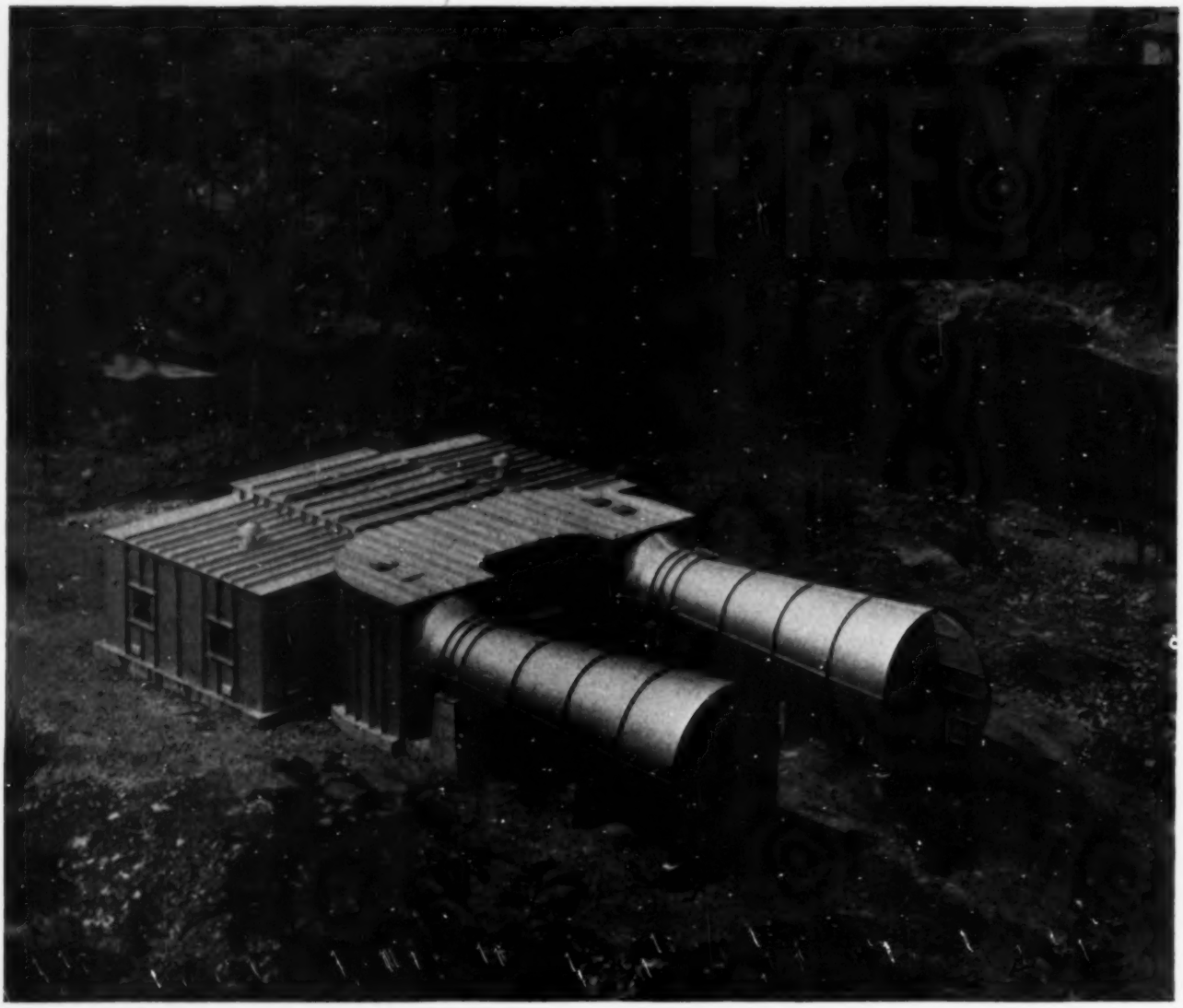
You'll find the answer in LINK-BELT's complete chain line... a size and type for every need

WHETHER it's a high-hp, heavy-impact drive or relatively slow-speed conveying service—you can get the *one* chain that best meets your needs from Link-Belt's complete chain line. Our engineers will be glad to work with you—help you select the right chain for your requirements. And you can be sure that any Link-Belt chain you buy is quality-built for longer life.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13,200



These Lungs Breathe—in Tons!

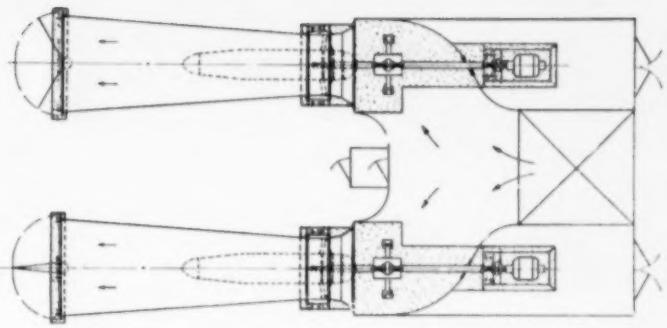
Jeffrey is the recognized leader in mine ventilation. Years of intimate contact with this problem have given Jeffrey unequaled "know how." Jeffrey AERODYNE Fans are custom-built for complete ventilation of mines requiring from 15,000 to 500,000 cubic feet of air per minute at mine pressures up to and including 20 inches.

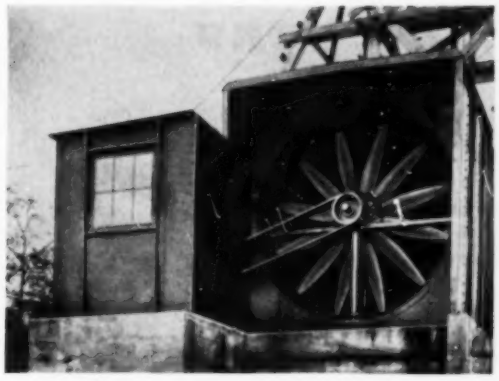
The Jeffrey AERODYNE 8H-96 Mine Fans shown above circulate 27,000 tons of fresh air per day—promoting *safety* throughout the mine. Jeffrey Ventilation Engineers are ready to help you install a system that combines maximum efficiency and economy.

AERODYNE FANS

FOR MAXIMUM MINE VENTILATION

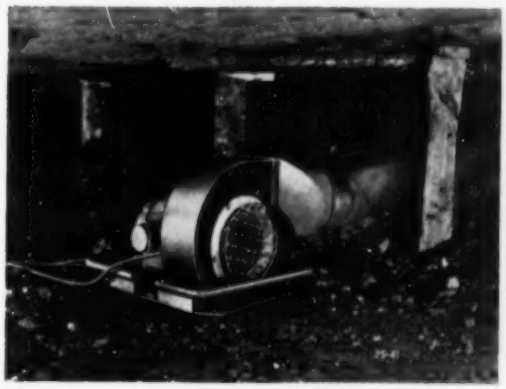
At Right: Plan view of two Jeffrey AERODYNE Parallel Fans exhausting from an air shaft. These fans are direct-driven, equipped with close-off doors for independent operation of either fan.





Jeffrey AERODYNE Junior Fans (9-foot model shown above) are available in two types and various sizes for ventilation of mines requiring pressures not exceeding 4" water gauge. Self-contained for easy installation, operation and inspection.

Jeffrey Portable Universal Blowers and Exhausters are highly efficient for ventilating rooms, single entries, etc. Wide variety of motors, flexible tubing and fittings. All units self-contained. Available in open or permissible type. Type 61 Blower shown below.



WRITE FOR JEFFREY FAN CATALOG NO. 797

THE JEFFREY MANUFACTURING CO.

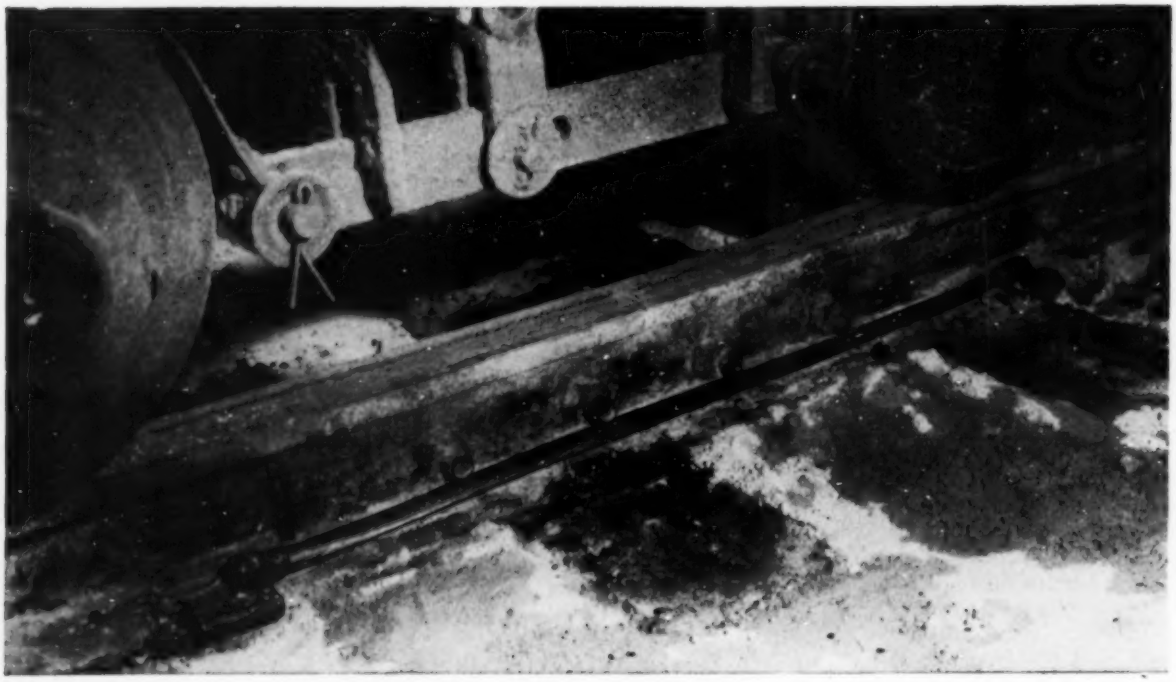
ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED . . . IT'S A JOB FOR JEFFREY!



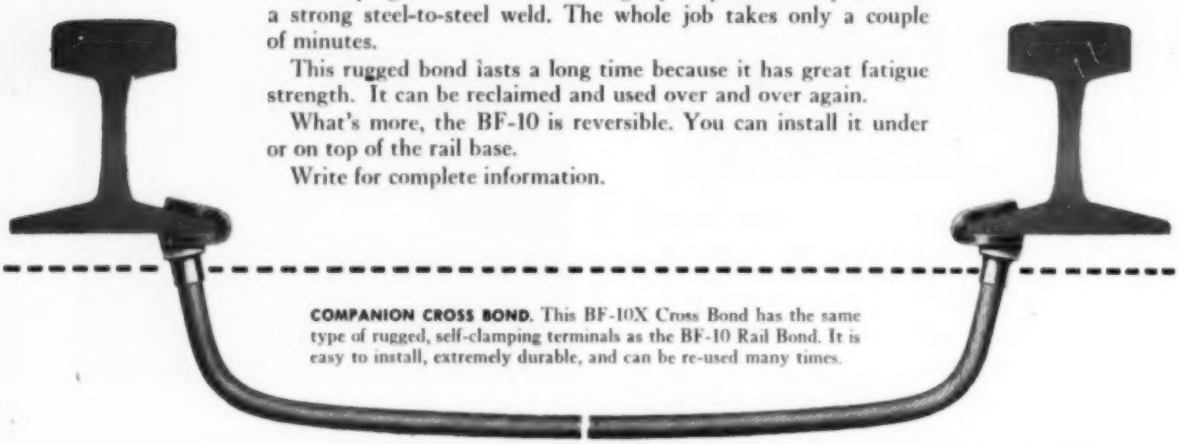
No clamps needed { **to install this TIGERWELD BF-10 RAIL BOND**

THE BF-10 Rail Bond installs quickly and easily. You don't have to fuss around attaching clamps to hold it in place while you weld. You just hammer the terminals on to the track. They are self-clamping and hold the bond tightly in place while you make a strong steel-to-steel weld. The whole job takes only a couple of minutes.

This rugged bond lasts a long time because it has great fatigue strength. It can be reclaimed and used over and over again.

What's more, the BF-10 is reversible. You can install it under or on top of the rail base.

Write for complete information.



COMPANION CROSS BOND. This BF-10X Cross Bond has the same type of rugged, self-clamping terminals as the BF-10 Rail Bond. It is easy to install, extremely durable, and can be re-used many times.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS

TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S American Tigerweld Rail Bonds

USS

UNITED STATES STEEL

To step up production

the beaver works with both head and tail

19405

. . . and so does a *Goodman Swing-motion Loader*

You, too, can speed up your operations with this versatile machine that loads out a wide path with only forward and backward movement . . . that can swing both loading head and discharge end to either side for pillar extraction work in close timbering.

Ask a Goodman sales engineer to arrange for you to visit a mine where you can watch a Goodman swing-motion loader in action.

The *Swing* is to Goodman Loaders

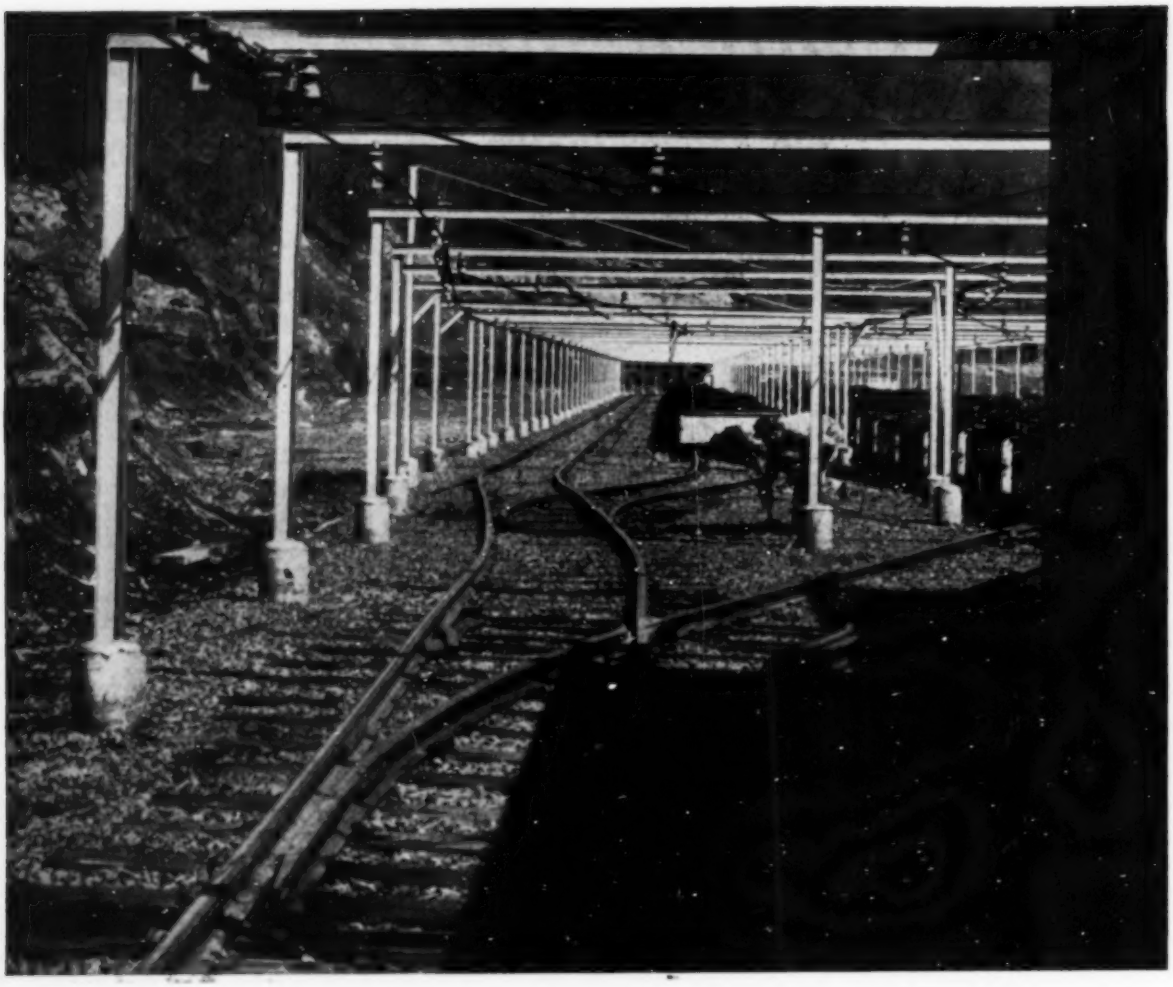
4 TYPES, 4 SIZES: ALL SWING-MOTION

TYPE	TRAMMING HEIGHT
665	41½ inches
666	36½ inches
660	33 inches
865	26½ inches

***AVAILABLE NOW** . . . a Data Sheet covering the Goodman line of swing-motion loaders. A copy is yours for the asking.*

Goodman
MANUFACTURING COMPANY
4834 S. Halsted Street • Chicago 9, Illinois

Cutting Machines · Conveyors · Loaders · Shuttle Cars · Locomotives · Continuous Miners



Here the Traffic Really Rolls

This is the kind of track that gives a mine official no worries at all. It is well planned, well made, well laid out. The part you see here—neat, trim, and compact—is typical of the whole system.

It's a Bethlehem prefabricated job, designed not only for present needs but those of the future. Working in close co-operation with the mine owners, Bethlehem studied every detail of the haulage problem; then designed the trackage and made the components. Rails were precut and precurved, with lengths and radii calculated exactly. Every element, down to the last bolt and nut, was selected to fill a particular need.

The system shows an advanced degree of planning and the highest level of workmanship. It can handle a large volume of high-speed traffic, with consistently low upkeep expense. It is a system free of the haulage snarls that are often so costly in man-hours and money.

Track like this pays off in a very short time. Why not ask us for full details? We can design and furnish you the whole layout, complete with rails, switches, switch stands, frogs, guard rails, braces, joint bars, and even the fastenings. Call for a Bethlehem engineer; he'll gladly come to your office and tell you how we work.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

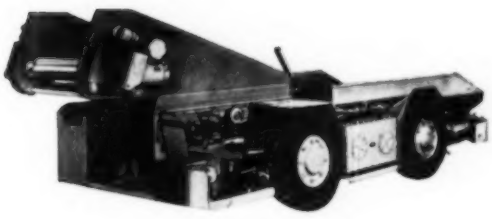
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM PREFABRICATED TRACK

Meet the Champ—The 1953 Model 10-SC!

It's the fastest round-trip SHUTTLE CAR built for high-production mining today.



The improved Joy 10-SC Shuttle Car is available as a Permissible or Non-Permissible unit, for net payload capacities up to 10 tons. It is built in 43", 48" or 54" heights (machine only) and may be equipped with 4", 6" or 8" sideboards. Tramming speed loaded is approximately 4½ m.p.h., and the unit is equipped with Joy-pioneered hydraulic cable reel, and hydraulically adjustable elevating discharge. Other special features include: 4-wheel drive, 4-wheel positive steering (hydraulic "power" type) and 4-wheel disc-type brakes, unaffected by dirt, coal dust, oil or water . . . improved arrangement of operator's controls . . . new "zone"-type lubrication . . . dependable Joy "Magnetax" controls, etc.

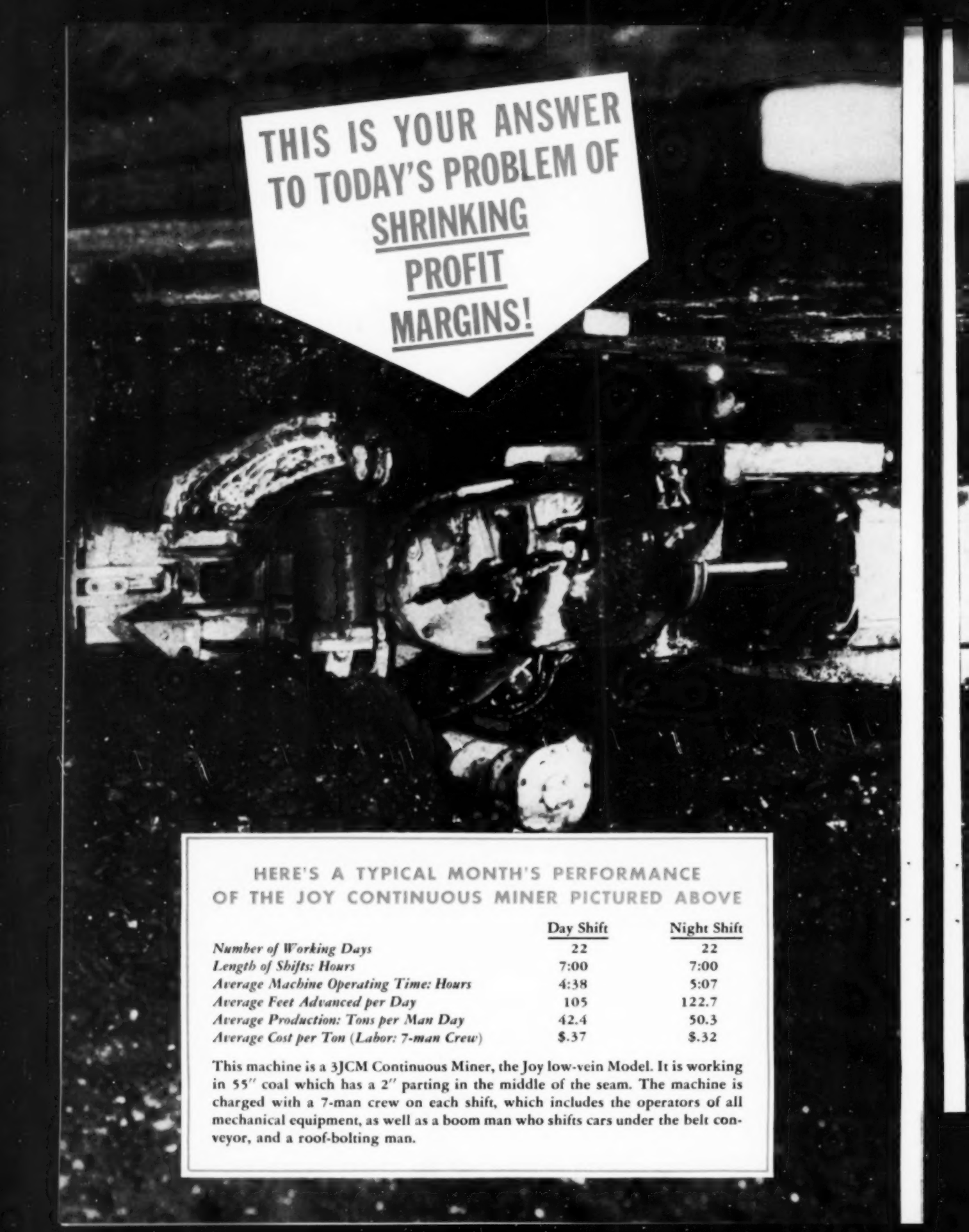
The Joy 10-SC Shuttle Car is famous for dependable, high-tonnage hauling under the toughest conditions, such as handling full loads of coal or rock in split-seam mining, etc. But we've improved it! The 1953-model 10-SC can get from the face to the discharge point and back again for another payload *faster than any other car in its class.* For some of the reasons why, check these features: traction motors of new design, with more reserve power . . . higher-speed, higher-powered conveyor discharge, cutting unloading time as much as half . . . over-capacity wheel units, brakes, gearing and frame for the least possible down-time and maintenance costs. ● There's actually nothing in the field like the 10-SC! Let us give you complete details. ***Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

W&D CL4595



HERE'S A TYPICAL MONTH'S PERFORMANCE OF THE JOY CONTINUOUS MINER PICTURED ABOVE

	Day Shift	Night Shift
Number of Working Days	22	22
Length of Shifts: Hours	7:00	7:00
Average Machine Operating Time: Hours	4:38	5:07
Average Feet Advanced per Day	105	122.7
Average Production: Tons per Man Day	42.4	50.3
Average Cost per Ton (Labor: 7-man Crew)	$.37	$.32

This machine is a 3JCM Continuous Miner, the Joy low-vein Model. It is working in 55″ coal which has a 2″ parting in the middle of the seam. The machine is charged with a 7-man crew on each shift, which includes the operators of all mechanical equipment, as well as a boom man who shifts cars under the belt conveyor, and a roof-bolting man.

In thin seams
or in
thick seams

The JOY CONTINUOUS MINER

marks a new era
of Efficiency
and Low Cost
in coal mining

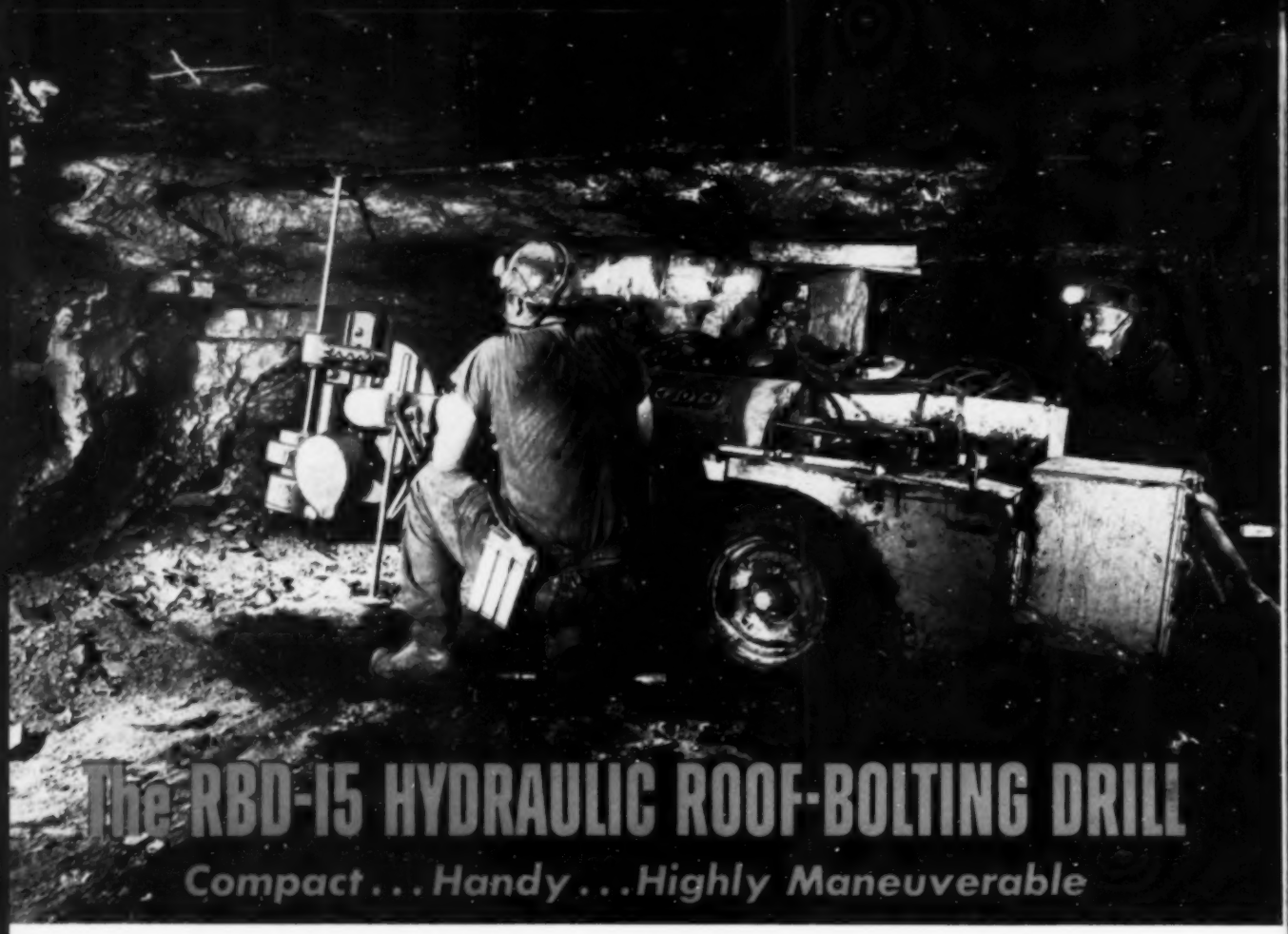
Consult a Joy Engineer

WSD CL 5559

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO



The RBD-15 HYDRAULIC ROOF-BOLTING DRILL

Compact . . . Handy . . . Highly Maneuverable

Now Doubly Flexible with 2-SPEED ROTATION CONTROL

Your roof-bolters will use the new Joy RBD-15's top rotation speed for maximum hole footage under good drilling conditions—then change to the lower speed with its doubled torque to tighten the nuts. The lower speed and higher torque are also ideal for use in hard drilling conditions.

The change is made instantaneously and at will—there is no time lost, nothing to adjust. Merely the touch of a hydraulic control valve accomplishes the shift, reducing the chuck speed from 625 to 312 rpm and increasing the rotating torque from 120 to 240 ft. lbs. The combination of increased torque and high thrust is ideal for cutting the harder rocks—and the feed pressure of the RBD-15 is adjustable up to 4000 lbs. (nearly double that of the RBD-10). Another feature: a dual-cylinder hydraulic drop leg, which gives a firm support while drilling.

GETS IN ANYWHERE

The RBD-15 is a self-propelled, hydraulically operated, rotary roof-bolting drill, close-coupled and compact. It's expressly designed for extreme maneuverability and adapted to tight quarters . . . has individually controlled pairs of wheels on each side to give it the turning, handling and steering qualities of a crawler-mounted unit. The RBD-15's combination of 150° boom swing and 180° roll, with 60° drill tilt and 180° swivel, assures drilling holes in any direction. In most cases, it will drill to the desired depth with one steel change or less.

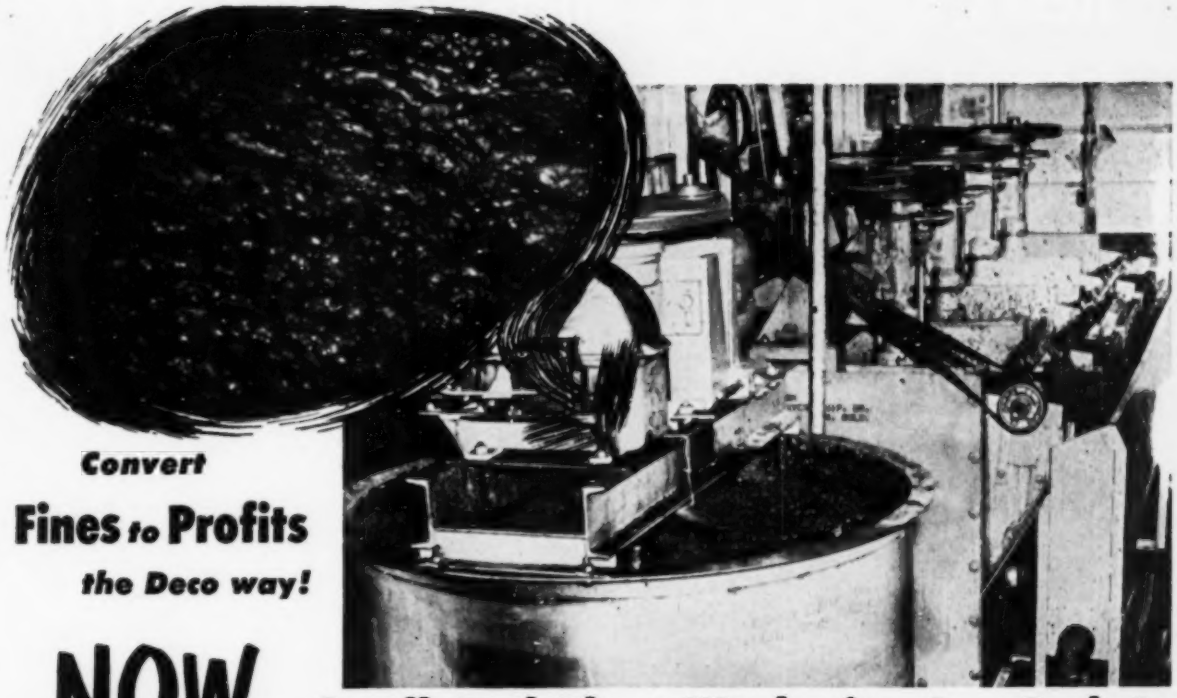
● Check with us for the roof-bolting equipment, rotary or pneumatic, that will give the best results under your conditions. ***Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer

WBD CL 4588

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT



Convert

Fines to Profits

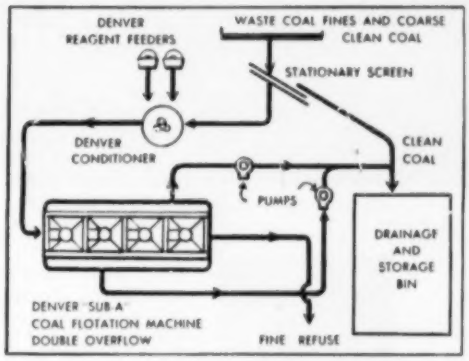
the Deco way!

NOW...Small Coal Plant Washeries Can Cash In On Reclaiming Fines...with Denver "Sub-A" Flotation!

Denver "Sub-A" Flotation gives operators of small washeries a low-cost method to recover fines at extra profits. You can recover a low-ash, clean coal product (—20 mesh to 0 mesh) that would otherwise be wasted. Recovery of fines can be the difference between breaking even and profit.

Coal fines, increased with mechanized mining, can now be recovered and cleaned with flotation. You reduce stream contamination, and you get a marketable product because of low-ash and sulphur content. Marketing is easy! Many washery operators simply add fines to their regular market product.

Why not cash in on extra recovery and make more profits with Denver "Sub-A" Flotation. Eliminate washery waste. Denver Equipment Company is the world's largest manufacturers of Flotation Machines. Let Denver Equipment Company engineers suggest an economical flotation layout for your washery or breaker—regardless of size. Find out about Deco's coal flotation test. Write, wire or phone today!



TYPICAL DENVER "SUB-A" FLOTATION RESULTS FOR FINE COAL FLOTATION

PRODUCT	% Weight	Analysis % Ash	Density % Solids
Feed to Flotation	100.0	23.5	20.0
Coal Flotation Concentrate	77.6	6.4	36.5
Refuse Waste	22.4	82.8	7.8

Reagent cost per ton of coal concentrate, 6.5c.
Moisture in filter cake, 21.5%.
Size analysis flotation feed, 20 x 0 mesh.

DECO FLOTATION ENGINEERS — DENVER EQUIPMENT COMPANY 24 HOUR SERVICE COMPANY

OUR 25TH YEAR OF FLOTATION ENGINEERING

DENVER EQUIPMENT COMPANY

1403 17TH STREET — DENVER, COLORADO

Here's the secret of alternate ROCKMASTER® teamed with alternate velocity loading

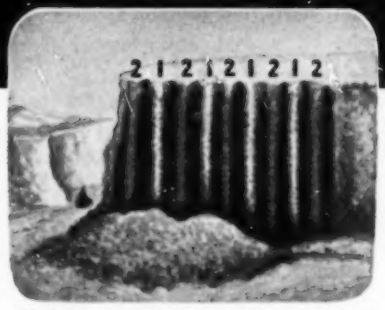
Alternate Velocity Loading is a newly introduced ROCKMASTER development which has produced astounding improvements in breakage and holds great promise for better blasting in mining, quarrying and construction work.

Every other hole is loaded with low velocity explosives. The balance are loaded with high velocity explosives. The faster ROCKMASTER millisecond delay caps fire the low velocity holes to stress the rock and the next delay interval releases the sharp second punch of the high velocity explosive.

The results of alternate velocity action can be seen in the photo above. The number one holes (which appear larger and lighter colored) were loaded with low velocity Apex and fired with No. 1 ROCKMASTER caps. The number two holes (which appear smaller and darker) were loaded with high velocity Apex and fired with No. 2 ROCKMASTERS.

All holes were initiated from the bottom to prolong confinement of the blast—giving maximum results of the alternate velocity loading.

At present Alternate Velocity Loading is being used only in quarry blasting, but it holds possibilities in many other fields. Talk with your Atlas representative about it. And send for your copy of the new Atlas periodical "Better Blasting" which details *the inside story* of Alternate Velocity Loading.



Absolutely no secondary breaking was necessary on this Alternate Velocity Shot. No. 1 holes show that explosive has worked longer on the burden than the high velocity explosive in the No. 2 holes.

ATLAS

ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE

Offices in principal cities

HAZACORD BULLETIN

HAZARD INSULATED WIRE WORKS • DIVISION OF THE OKONITE COMPANY, WILKES-BARRE, PA.

NEW SHUTTLE-CAR CABLE CONSTRUCTION PUTS "HEX" ON STRAIN..INTERNAL ROTATION..FATIGUE

New, Improved Grounding Conductor Gives HEX-TITE Added Flexibility

Hazacord HEX-TITE Type G, provides extra workability and flexibility in grounded cables. The grounding conductor is composed of many more fine wires protected by a cotton serving that forms a smooth channel through which the ground wire can work.

Special Lubricated Strand

Hazard's processing of the grounding strand permits the conductor to work freely without wear or danger of breakage of the strands. This added workability of the grounding conductor permits sharp bending of the cable without fatigue.

HEX-TITE Conductors Provide Exceptional Heat Resistance

Hazard Performite Heat-Resisting Insulation is used in all HEX-TITE Cable. It is suitable for operating temperatures as high as 75C. It provides a safety margin of about 25% to withstand overload surges.

New Hazacord HEX-TITE Twin Shuttle-Car Cable Promises Longer Lived, Lower Cost Trailing Cable Operation

Resisting internal twisting and slippage, new Hazacord HEX-TITE Twin Cable sets a new standard for trailing cable. Hexagonal insulated conductors provide six plane surfaces to form an extra strong mechanical bond with the protective Hazaprene ZBF Sheath. An open reinforcing braid over the hex-insulation is an additional guard against excessive pulling and dislocation.

Special Adhesive Bond

Hex-insulation in the new Hazacord HEX-TITE is treated with a strong adhesive bonding agent for further resistance to slippage within the sheath. Yet, this adhesive permits removal of the sheath for splicing and repair without tearing or damage to the conductor.

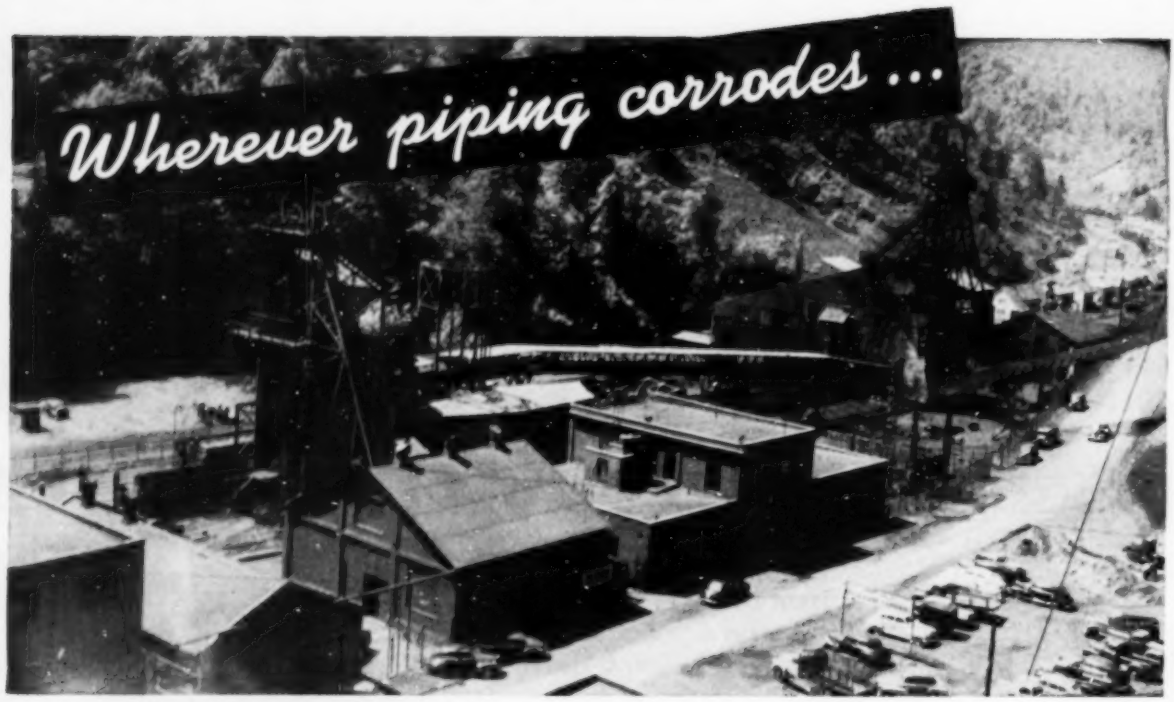
Hazard representatives throughout the mining areas have complete information on new HEX-TITE Twin Shuttle-Car Cable. You can also write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pennsylvania.

Tough, Hazaprene ZBF Sheath First with Mine Operators

For real protection, new Hazacord HEX-TITE has the famous Hazaprene ZBF Sheath. It offers superior resistance to flame, oil, acid and mechanical damage. And this sheath is pressure-vulcanized in a continuous metal mold for a smooth, dense surface that resists abrasion and tearing. Proof of mold curing is the full description and official approval number P-104BM embossed in raised letters in the sheath.

Prevents Shorting

The rugged Hazaprene Sheath completely encases each hex-conductor, providing a barrier between power conductors and between power and grounding conductor on Type G. This protective wall prevents shorting when the cable is run over and compressed.



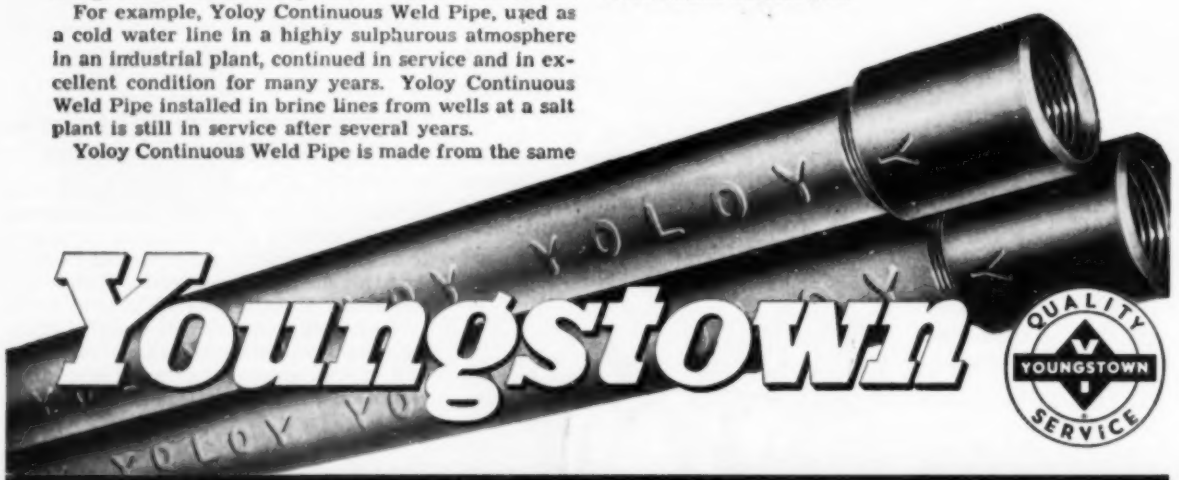
use YOLOY continuous weld pipe

Yoloy Continuous Weld Pipe offers distinct advantages for use in mines and industry where replacements due to corrosion are frequent. In addition, its use is recommended wherever piping is concealed—in commercial buildings, schools and residences.

In standard tests Yoloy steel has demonstrated that its resistance to atmospheric corrosion is four to six times greater than that of regular steels. In actual installations Yoloy Pipe has demonstrated that it has a high resistance to many other corrosive conditions.

For example, Yoloy Continuous Weld Pipe, used as a cold water line in a highly sulphurous atmosphere in an industrial plant, continued in service and in excellent condition for many years. Yoloy Continuous Weld Pipe installed in brine lines from wells at a salt plant is still in service after several years.

Yoloy Continuous Weld Pipe is made from the same nickel-copper steel composition that has proved so successful in service in the oil, mining, railroad, chemical, trucking and other industries where resistance to corrosion and abrasion is of prime importance. This pipe is easy to thread and fabricate with standard pipe tools. It can be electric or gas welded readily. It has high strength and high resistance to abrasion, shock and vibration fatigue. For further information, write or phone the Youngstown District Sales Office nearest you.



THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices Youngstown 1, Ohio

Export Office - 500 Fifth Avenue, New York

COLD FINISHED CARBON AND ALLOY BARS - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - WIRE - PIPE AND TUBULAR PRODUCTS - CONDUIT - RODS - SHEETS - PLATES - BARS - RAILROAD TRACK SPIKES

IDEAS at work...cutting costs!

P&H Electric Shovels

Progress doesn't come by standing still! And many users of P&H Electric Shovels have learned (to their great benefit) of the strides made to cut costs in all kinds of open pit work.

How has P&H done it? Higher electrical efficiency results from equipment designed and built by P&H specifically for electric digging. Stepless power regulation gives smoother operation with none of the old contactor troubles. P&H Magnetorque* Hoist Drive gives you snappier dipper action—lasts the life of the machine. Air-filtered cab protects all electrical equipment. Independent propel permits faster move-ups. All-welded construction of rolled alloy steels provides the husky strength to withstand years of continuous shock loads.

These and many other advancements, still exclusive with P&H, mean steadier, faster digging. That, in the final analysis, means lower tonnage costs. If that's what you're looking for . . . P&H is your answer.

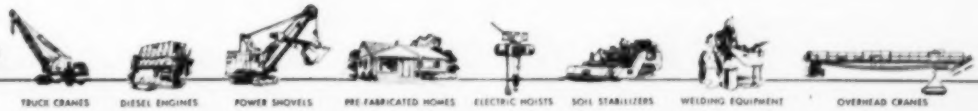
**T. M. of Harnischfeger Corporation for electro-magnetic type coupling.*

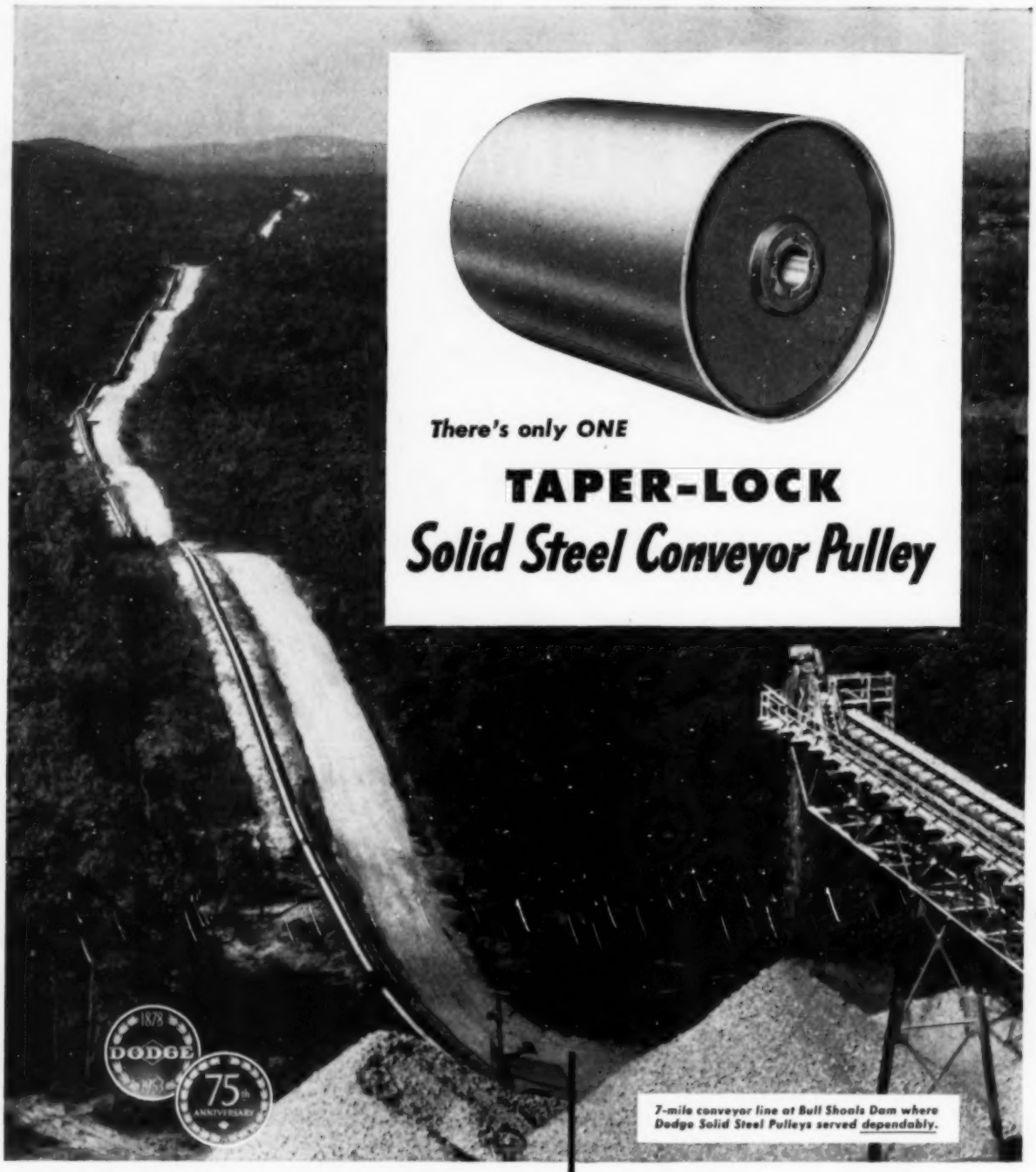
P&H LARGE EXCAVATOR DIVISION

HARNISCHFEGER CORPORATION

MILWAUKEE 46, WISCONSIN

the P&H *Line*





There's only ONE

TAPER-LOCK
Solid Steel Conveyor Pulley

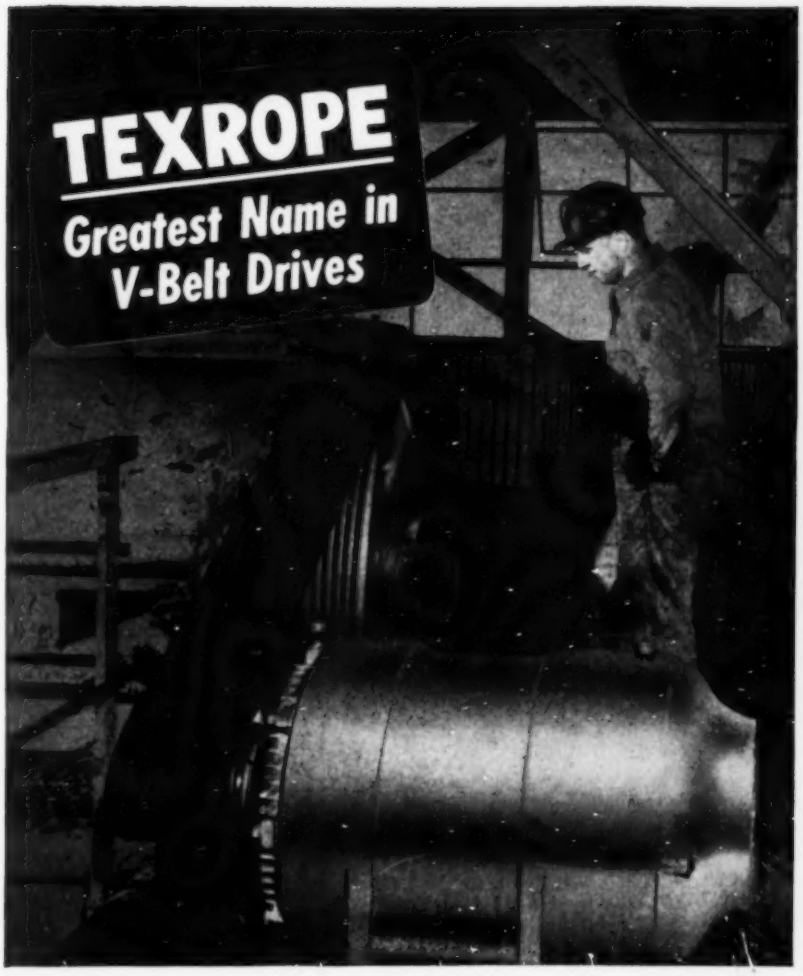
7-mile conveyor line at Bull Shoals Dam where Dodge Solid Steel Pulleys served dependably.

The famous TAPER-LOCK Bushing in the Dodge Solid Steel Conveyor Pulley gives you the equivalent of a shrunk-on fit—and greatly simplifies the job of mounting and de-mounting! The drum type construction of this modern product provides maximum strength with minimum weight. Accurately formed; *uniform* rim thickness. Fully enclosed to exclude dust, dirt, water. Diameters 6 in. to 8 ft., all face widths. Popular sizes stocked by our distributors.

DODGE MANUFACTURING CORPORATION, 3000 Union St., Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory-trained by Dodge, he can give you news of cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.



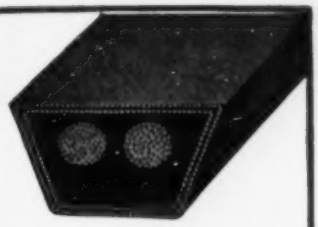
Everything in V-Belt Drives

from one reliable source!

GRIT, VIBRATION AND SHOCK LOADS are tough on drives. Allis-Chalmers has both the engineering experience and the drive equipment to lick both the usual and unusual problems. Call your nearby Allis-Chalmers distributor or district office for help on your drive problems, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3944

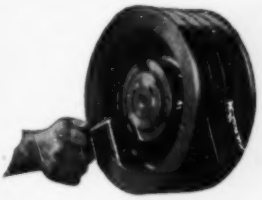
Texrope and Magic-Grip are Allis-Chalmers trademarks.

ALLIS-CHALMERS



***TEXROPE* Grommet V-Belts**—20 to 50% longer life than ordinary belts. Size for size, grommet belts give 1/3 more gripping power, pull heavier loads with higher safety factor.

STANDARD CAST IRON SHEAVES — Made to order from stock patterns. One to 14 grooves for A, B, C, D or E belts. One to 1000 horsepower. Split sheave or split hub.



***MAGIC-GRIP* SHEAVES** — Semi-steel casting with interchangeable, patented taper bushings. On and off in a jiffy. Cannot shake loose. Two to 12 grooves for B, C and D belts; 2 to 250 hp.

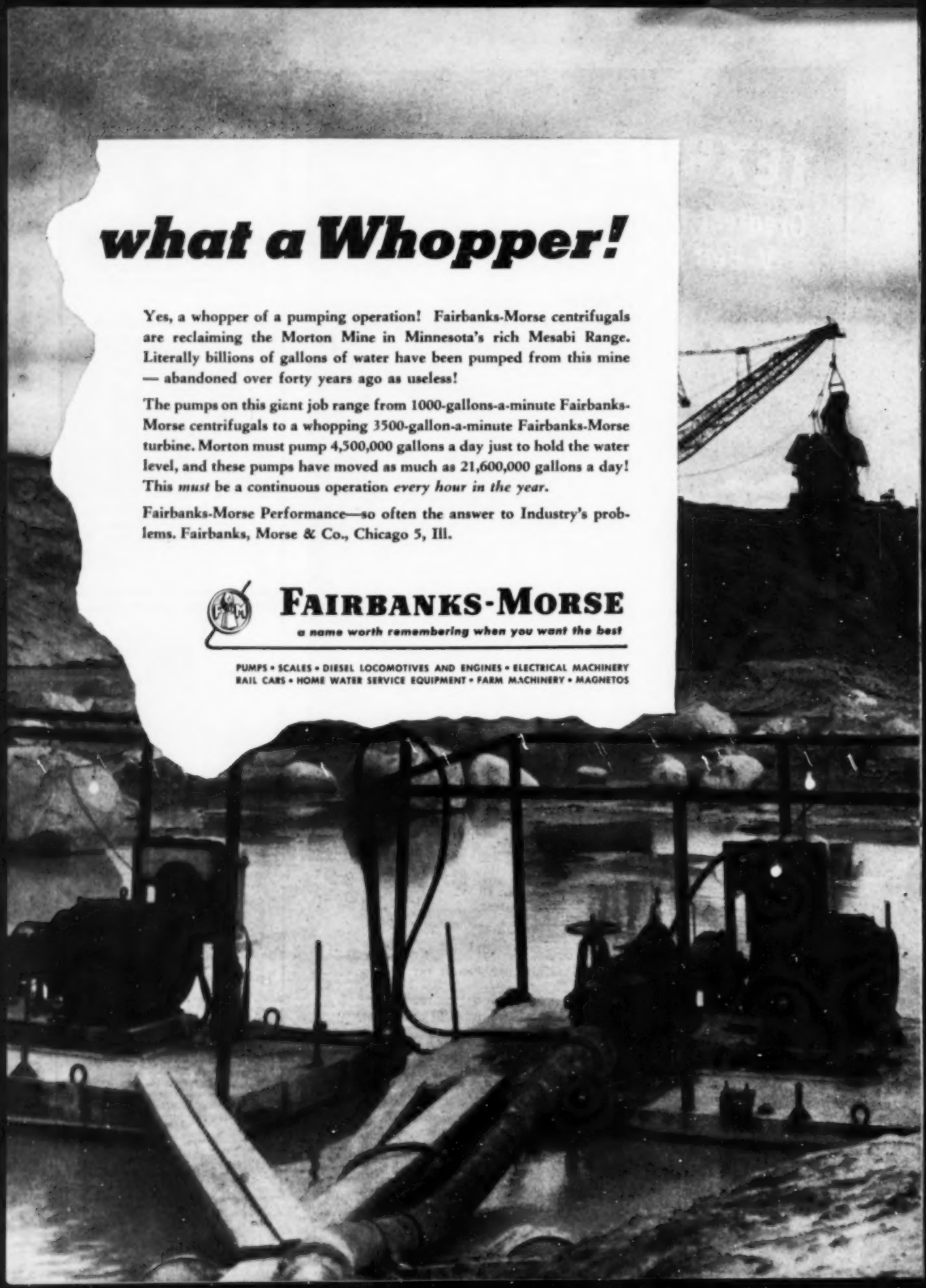
Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.

MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.



what a Whopper!

Yes, a whopper of a pumping operation! Fairbanks-Morse centrifugals are reclaiming the Morton Mine in Minnesota's rich Mesabi Range. Literally billions of gallons of water have been pumped from this mine — abandoned over forty years ago as useless!

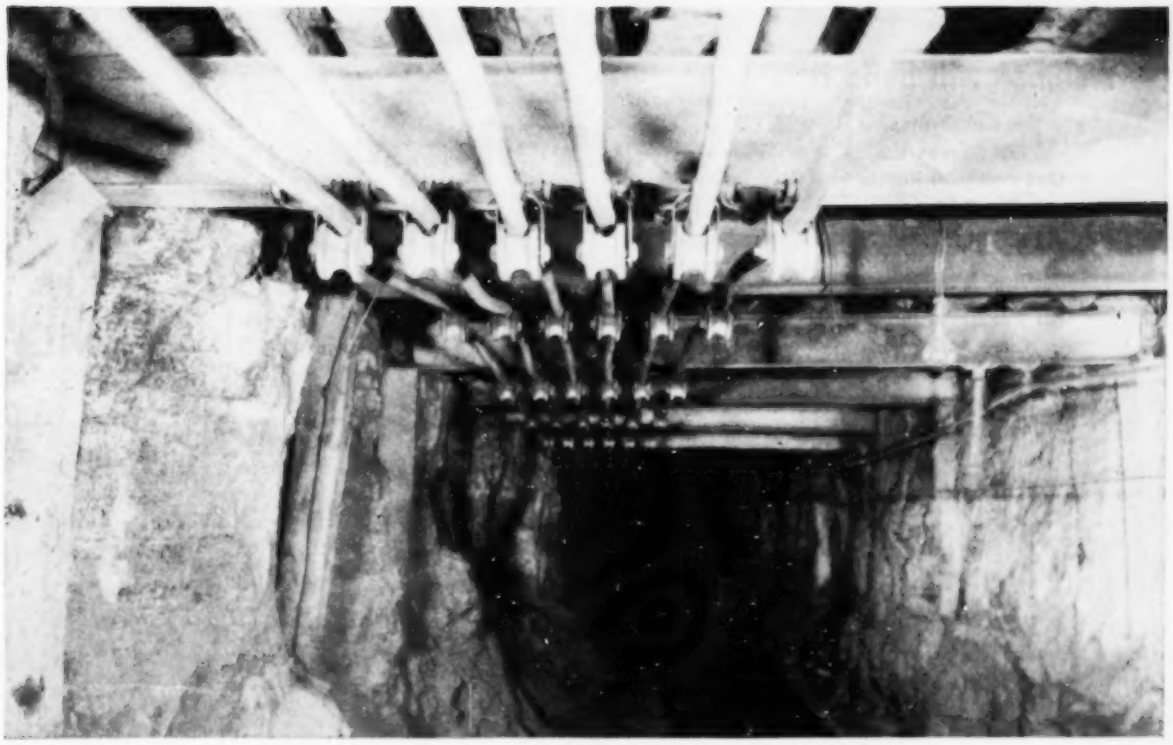
The pumps on this giant job range from 1000-gallons-a-minute Fairbanks-Morse centrifugals to a whopping 3500-gallon-a-minute Fairbanks-Morse turbine. Morton must pump 4,500,000 gallons a day just to hold the water level, and these pumps have moved as much as 21,600,000 gallons a day! This *must* be a continuous operation *every hour in the year.*

Fairbanks-Morse Performance—so often the answer to Industry's problems. Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE

a name worth remembering when you want the best

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY
RAIL CARS • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS



YOU NEED THESE ADVANTAGES

for this kind of Service!

Anhydrex Insulation

- High dielectric strength
- Low power factor
- Low dielectric constant
- High insulation resistance
- Low water-absorption and diffusion
- Resists deformation
- Resists electrical leakage

Anhydrex Neoprene Jacket

- Resists abrasion and rough handling
- Elimination of lead sheath does away with crystallization, corrosion and sheath currents
- Resists heat and aging

Completed Cable

- Electrical and mechanical stability
- Light weight and small diameter make them easy to handle, easy to lower into place and easy to pull out and relocate if desired
- Available in single or multi-conductor types, designed for whatever voltage is required
- More complete information may be obtained from your nearest Simplex representative or by writing to the address below

Simplex

For any borehole, shaft, or feeder cable problem, there is an ANHYDREX Cable to meet your needs.

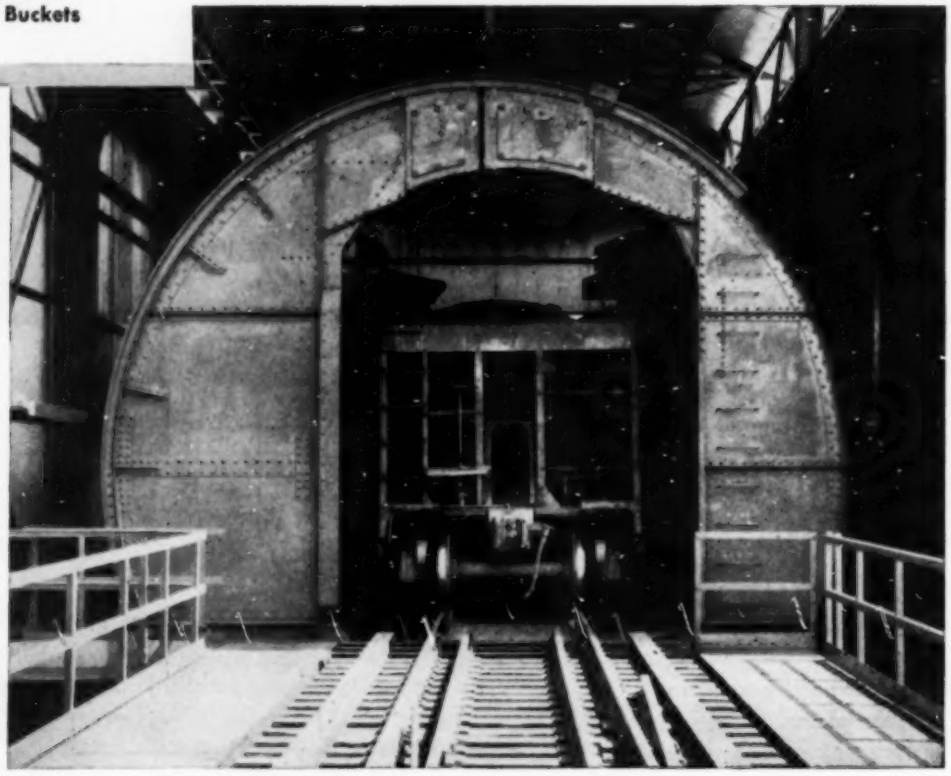
SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

Wellman will build it

Special Cranes
Car Dumpers
Gas Producer Plants
Ore Bridges
Charging Machines
Forging Manipulators
Gas Flue Systems
Gas Reversing Valves
Coke Pushers
Mine Hoists
Skip Hoists
Clamshell Buckets

→ Wellman car dumpers

...designed and built for years of dependable service



Wellman 60-ft., 4-clamp Revolving Car Dumper. A rack segment and pinion at each end of the frame turns each end equally, preventing distortion of the frame.

● The complete line of Wellman Car Dumpers includes Lifting, Turnover, Traveling and Revolving Types, the latter is shown above. It is self-contained, requiring no external structures. You can depend on Wellman equipment for many years of economical performance. It is backed by more than half a century of experience in engineering, manufacturing and construction.

THE WELLMAN ENGINEERING COMPANY

7000 CENTRAL AVENUE • CLEVELAND 4, OHIO

Beats weather on tough lube job!

● Rain and snow washed the lubricant from the dipper stick and pinion gears . . . hot weather caused it to "melt" and run off. That meant that operators of this shovel used in a northern open pit mining project had to take time from every shift to apply new lubricant. The cost in operators' time and in lubricant was excessive. Dripping grease was untidy and unsafe.

Asked for his recommendations, a Standard Oil lubrication specialist suggested HD CAM AND GEAR LUBRICANT. The dipper stick and pinion gears were steam cleaned. The recommended lubricant was heated and brushed on in a smooth, even coating. HD CAM AND GEAR LUBRICANT has stayed on the job in all kinds of weather, and the lubrication period has been extended from a single shift to as long as two weeks. Dripping has been eliminated, lubrication costs have been cut.

HD CAM AND GEAR Lubricant

The experience of this mining company points the way to savings you can make through the use of Standard Oil's lubrication engineering service and high quality products. How you can easily and quickly put this lubrication service to work for you is explained at the right.

Standard Oil Company, (Indiana), 910 South Michigan Avenue, Chicago 80, Ill.

What's your problem?

C. F. Klenner, of Standard Oil's Duluth office, is the specialist who was called in by operators of this mine to help solve their lubrication problem. His practical experience and special training enabled him to recommend a lubricant that did the required job.

C. F. Klenner is one of a corps of Standard Oil lubrication specialists located throughout the Midwest. These men are especially trained to help you with your industrial or mining lubrication problems. To obtain the prompt, on-the-spot services of an experienced lubrication specialist, phone or write your local Standard Oil Company office.

When the specialist calls, discuss with him the benefits offered by such products as:

STANOIL Industrial Oils—Simplify your lubrication jobs by using this one line of oils that provides cleaner operation of loader and crane hydraulic units, supplies effective lubrication in compressors, gear cases, and circulating systems.

SUPERLA Mine Lubricants—These new, improved oils and greases provide better lubrication of cutters, loaders, locomotives, mine cars, and other underground equipment. They eliminate transmission-case deposits, reduce clutch-plate gumming, and minimize wear on gears and bearings.

STANDARD OIL COMPANY STANDARD *(Indiana)*

Low Cost Crushing-

THE

McLANAHAN

Bantam Buster Single Roll COAL CRUSHER

—with cut Gears—Segment Rolls and Renewable Crushing Plate Tips

Crush hard or soft coal in strip or underground operations with the dependable, low cost McLanahan Bantam Buster *Single Roll* Coal Crusher. This machine crushes coal to desired size, with a minimum of operating and maintenance expense.

Bantam Busters have a high ratio of reduction and are portable, self-contained units, adaptable for any installation. They are furnished with 18" diameter roll up to 48" wide, and 24" or 30" diameter roll up to 60" wide. Crushing plate is quickly and easily adjusted to vary size of product. Roll and counter-shafts are carried on babbitted or self-aligning roller bearings. Investigate the possibilities of this machine for your operation.

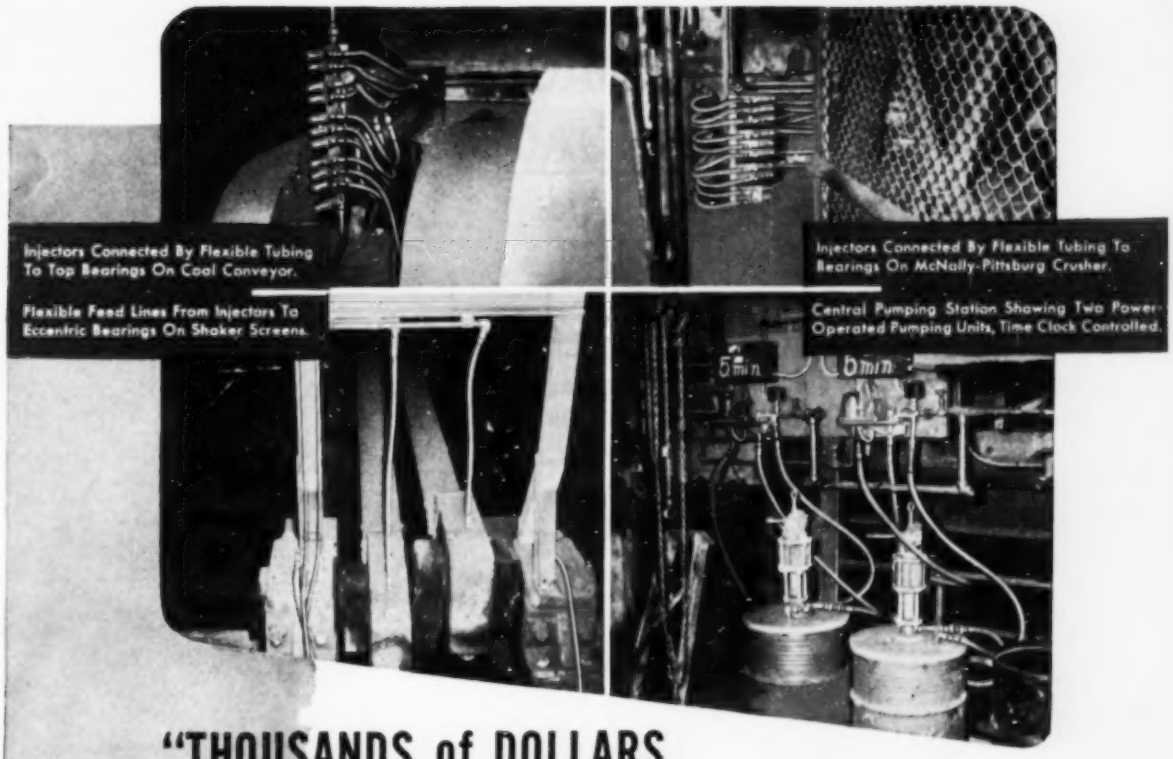
WRITE *today for* **Bulletin BB5112**

McLANAHAN AND STONE CORPORATION

Pit, Mine and Quarry Equipment Headquarters . . . Since 1835

HOLLIDAYSBURG, PENNSYLVANIA

Dependable Products: Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Roll Grizzlies, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Sand Drags, Hoists, Jigs, Dry Pans, Dryers, Scrap Bundlers, Pulleys, Gears, Bearings, Sprockets, Sheaves, Rollers, Bin Gates, Elevator Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.



Injectors Connected By Flexible Tubing To Top Bearings On Coal Conveyor.

Injectors Connected By Flexible Tubing To Bearings On McNally-Pittsburg Crusher.

Flexible Feed Lines From Injectors To Eccentric Bearings On Shaker Screens.

Central Pumping Station Showing Two Power-Operated Pumping Units, Time Clock Controlled.

"THOUSANDS of DOLLARS in MANHOURS and DOWNTIME SAVED

by *Lincoln* Centralized Lubrication System"

at WIERTON COAL COMPANY'S Isabella Mine, Isabella, Penn.

Approximately 500 bearings are lubricated automatically, by time clock control, in this typical preparation plant installation.

The operator reports *not one single bearing replacement or failure due to faulty lubrication* since the Lincoln System was installed four years ago. Lubricant consumption has been reduced 30 lbs. per day. Savings in manhours and machine downtime have been reduced by thousands of dollars.

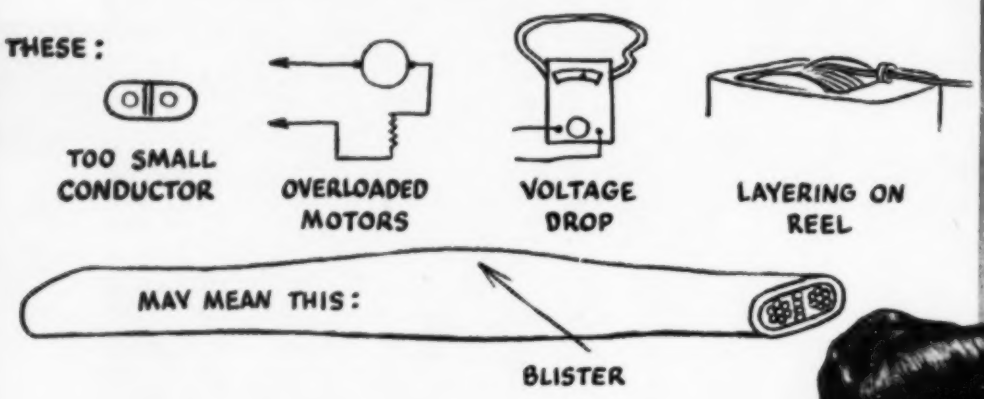
In addition to the tremendous reduction in downtime for Lubrication, you can eliminate accident hazards associated with manual lubrication . . . increase bearing life up to 1500% . . . eliminate waste and contamination of lubricants.

Bulletin 680 describes many other advantages of LINCOLN Centralized Lubrication Systems for the mining industry. Write for your copy.

• • • PIONEER BUILDERS

LINCOLN LUBRICATING EQUIPMENT • • •

HOW TO SPOT DAMAGE FROM CURRENT OVERLOAD . . .



. . . AND WHY THERE'S GREATER HEAT STAMINA IN ANACONDA'S NEW MINING MACHINE CABLE

Blisters, formed by gases from overheated installation, are a sure sign of cable overloading. A torn cable may result. Since you can't always control overloads, it's important to choose *quality* cable.

Today, due to better design, jackets and insulation, good cables shouldn't cook on the reel the way they used to. But this only makes overloads harder to detect. They still may be present . . . caused by too small a conductor, overloaded machines, voltage drop or even layering of the cable. With 4 layers on the reel, according to I.P.C.E.A., unventilated bottom layers lose 65% of capacity.

WHY THE NEW ANACONDA CABLES ARE SAFER

First, they are more flame-resistant. Jacket is made from a new neoprene formula. Improved cold-rubber insulation gives greater heat stamina. Patented breaker strip* insures a safer ground. No ANACONDA Cable has ever failed a U. S. Bureau of Mines flame-test!

CABLE LIFE NOW MUCH LONGER

In 15 mines recently surveyed, ANACONDA Cables on shuttle cars are lasting up to 300% longer than cables made only a few years ago. Together, jacket and insulation protect these cables better – especially in wet mines where sliver-cuts can cause shocks. The cables are tougher. New-type stranding flexes better under tension.

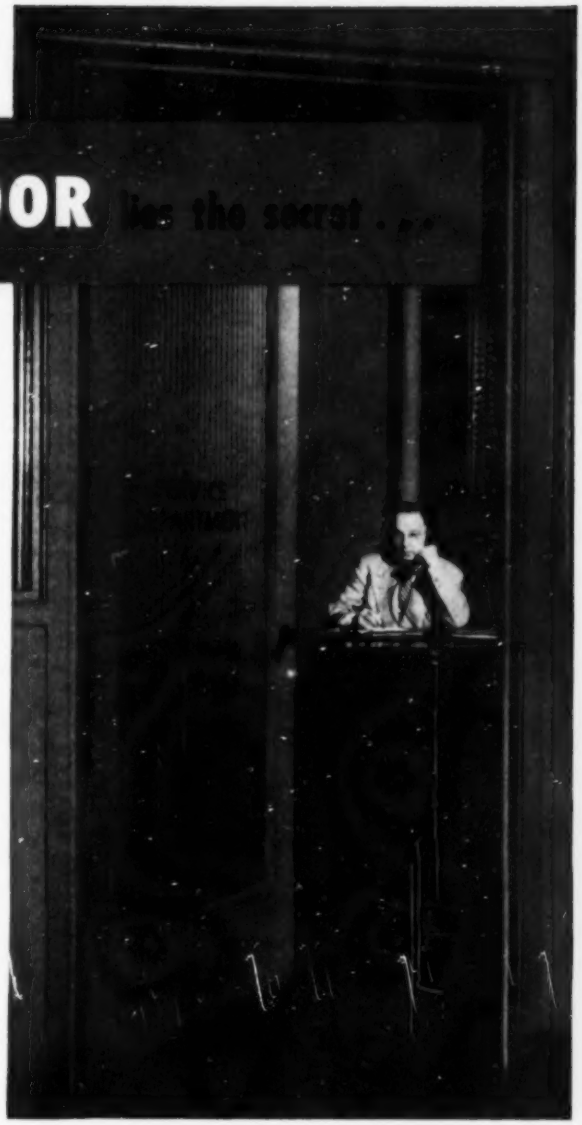
All this means economy because *one* break in cheap cable costs more than you can save by buying on price. For a sample of this new cable, call your Anaconda Sales Office or Distributor. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.* 53302

ANACONDA®

TODAY'S HEADQUARTERS FOR MINE CABLE

*U. S. Patent No. 2,455,773

BEHIND THIS DOOR lies the secret . . .



of why your Heyl & Patterson Heavy Bulk Materials Handling Installation will last . . . and last . . . and last

Since 1887 Heyl & Patterson has designed, fabricated and erected well over 3000 Heavy Bulk Materials Handling installations of all types . . . from coal tipples to complete coal preparation plants . . . from pig casting machines to mammoth ore bridges.

Today the great majority of these installations are still in operation, including many that were built 50 to 65 years ago.

The H & P Service Department is an important factor in the consistent long life of all Heyl & Patterson installations.

Night or day, the Heyl & Patterson Service Department is prepared to go all out to supply H & P customers with replacement and spare parts in the shortest possible time.

This on-the-spot service is facilitated by Heyl & Patterson's system of recording all detailed drawings on 70 mm microfilm, which is available at a moment's notice.

Time and time again the H & P Service Department has done the "next to impossible" to keep H & P installations in operation. Letters of thanks from customers prove this to be the rule rather than the exception.

The operations of the H & P Service Department in working with the customer after a contract is completed is another example of the "follow-through" that your business receives at Heyl & Patterson . . . the "follow-through" that is possible because we have our own Engineering Department, our own Research Department, our own Machine Shop, our own Structural Shop, our own Erection Department and our own SERVICE DEPARTMENT.

All H & P departments work together to provide you with the world's finest Heavy Bulk Materials Handling Equipment.

Heyl & Patterson, Inc.

"SINCE 1887"

55 WATER STREET · PITTSBURGH 22, PA

Heavy Bulk Materials Handling Equipment

All The Way from Design to Erection

SPEED where it saves you most

Here a Bucyrus-Erie drill pounds out hole in an open-pit coal mine. Derrick head shock absorber protects machinery from vibration—reduces cable wear by keeping shock loads down. A Bucyrus-Erie "first" the rubber shock absorber is the most successful yet devised.

BUCYRUS ERIE

Bucyrus-Erie blast hole drills have a nation-wide record for ramming holes down fast—and cheap. A brief rundown shows why—

Big 5⅝ to 12-in. holes—quick— The right balance of tool travel distance, tool weight, and blows per minute—combined with an unmatched rock shattering snap at the impact point—put these rigs "holes ahead" in penetration speed.

Quick moves—Long, sure-footed crawlers mean fast, easy rolling over rough ground—positive traction up 30 percent grades.

Rapid set-ups—Hydraulic leveling jacks (standard on 50-T; optional on 29-T) eliminate elaborate ground preparations, blocking and cribbing. Built-in stabilizing jacks (on the 22-T, 27-T and 29-T machines) provide time-saving 3-point setups even under adverse ground conditions.

Close-grouped controls—Easy handling levers are positioned close together for convenient reach. A driller can run this rig at top speed for long periods without slow down. Built-in tool wrenches (on all except 22-T) safely speed tool changing.

For fast, profitable operation standardize on big hole, fast hole Bucyrus-Erie drills. Four models—5⅝ to 12-in. hole capacities.

10853

BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin

Hard Coal or Soft Coal...

Leading Operators use "Eucs"

Built for tough off-the-highway service, Rear-Dump and Bottom-Dump "Eucs" are cutting the cost of hauling overburden, coal and mine waste on scores of mining operations. Big payload capacity, fast travel speed and high job availability add up to more loads per hour and lower cost per ton or yard hauled.

Your Euclid Distributor will provide a hauling production and cost estimate for your operation . . . there's no cost or obligation so get in touch with him soon. Let him show you how "Eucs" can cut your coal hauling costs.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

In the Pennsylvania anthracite field, Wadesville Production Company has used Rear-Dump "Eucs" of 22 to 34 ton capacity to move more than 17 million cu. yds. of overburden and nearly 2 million tons of coal since operations began in June of 1948. Performance has been so satisfactory that "Eucs" are standard hauling equipment on this big operation . . . 20 units are presently in use.

Truax-Traer Coal Company has used Bottom-Dump Euclid Coal Haulers at their Illinois operation since 1935. The Euclid fleet, 14 units of 20 ton capacity and six 25 ton "Eucs", delivers an average of 8500 tons of coal to the washing plant per eight hour day. High travel speed from pit to tipple on hauls up to 3½ miles and the long service life of the Euclids help to keep hauling costs at a minimum . . . every "Euc" purchased by the company is still in service!

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

Wire Rope at Work—Rich seams of coal often lie only a few yards underground. But to uncover the coal requires vast stripping operations in which giant dragline excavators or power shovels remove incredible tonnages of overburden. The work pictured here, photographed in an Eastern Pennsylvania field, is typical.

The stripping machine uses twin Bethlehem Purple Strand draglines and hoist lines to operate the 22-yd bucket. These big, sturdy wire ropes prove more than a match for the gruelling loads they must handle, week after week. In this, as in every other service involving wire rope, Bethlehem's Purple Strand will stick on the job, not asking how rough or tough the job may be.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:
MINING • CONSTRUCTION • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

For Heavy, Exposed Gears Sinclair Jet Lubricants . . .

Have Extreme Pressure Quality!

Retard Wear!

End galling of gear teeth!

Will *not* thin out at high temperatures!

Maintain lubrication at frigid temperatures!

Last longer!

Resist washing out . . . throwing out . . . channeling out!

Reduce lubricant consumption!

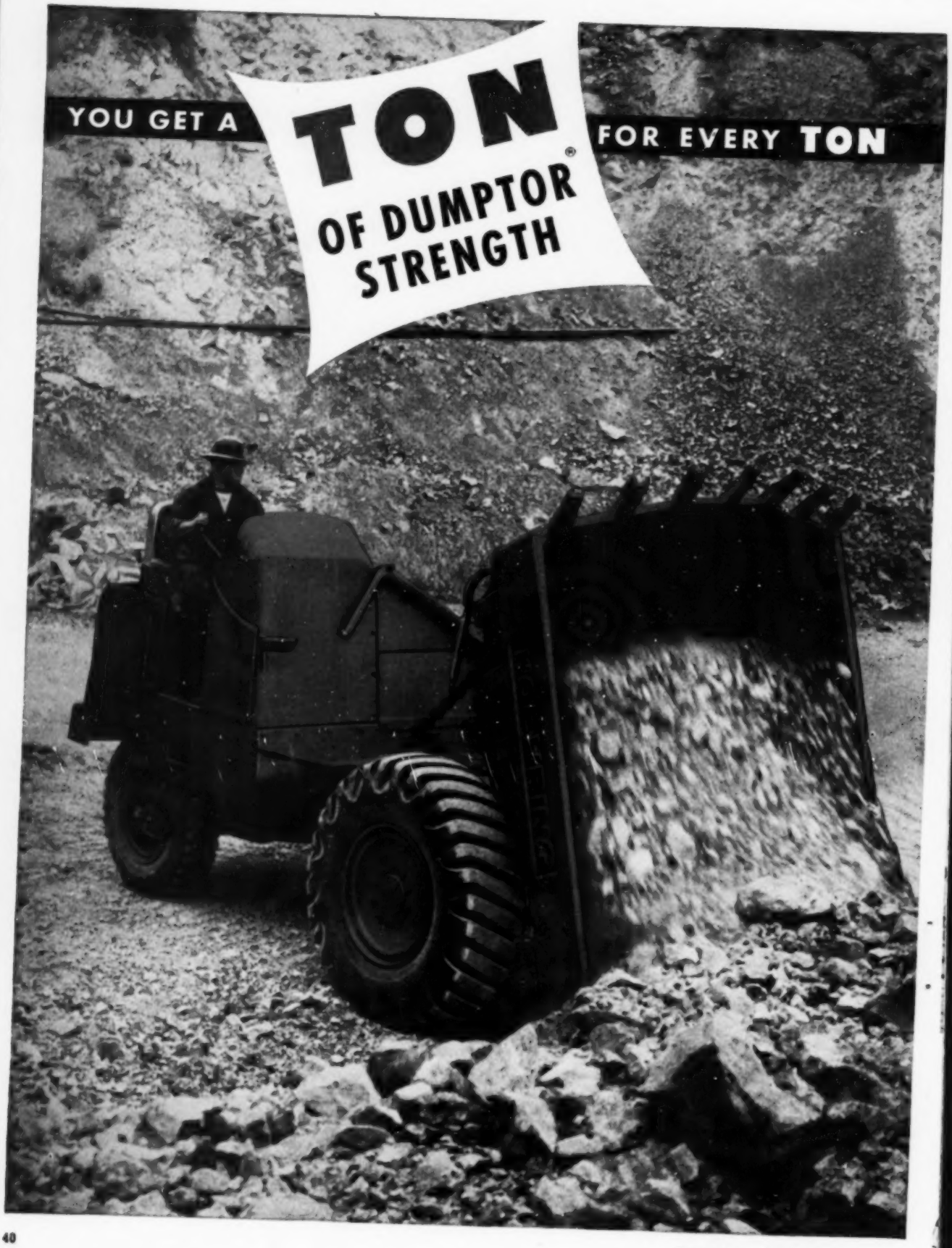
Stretch application schedules for hard-to-reach gears!

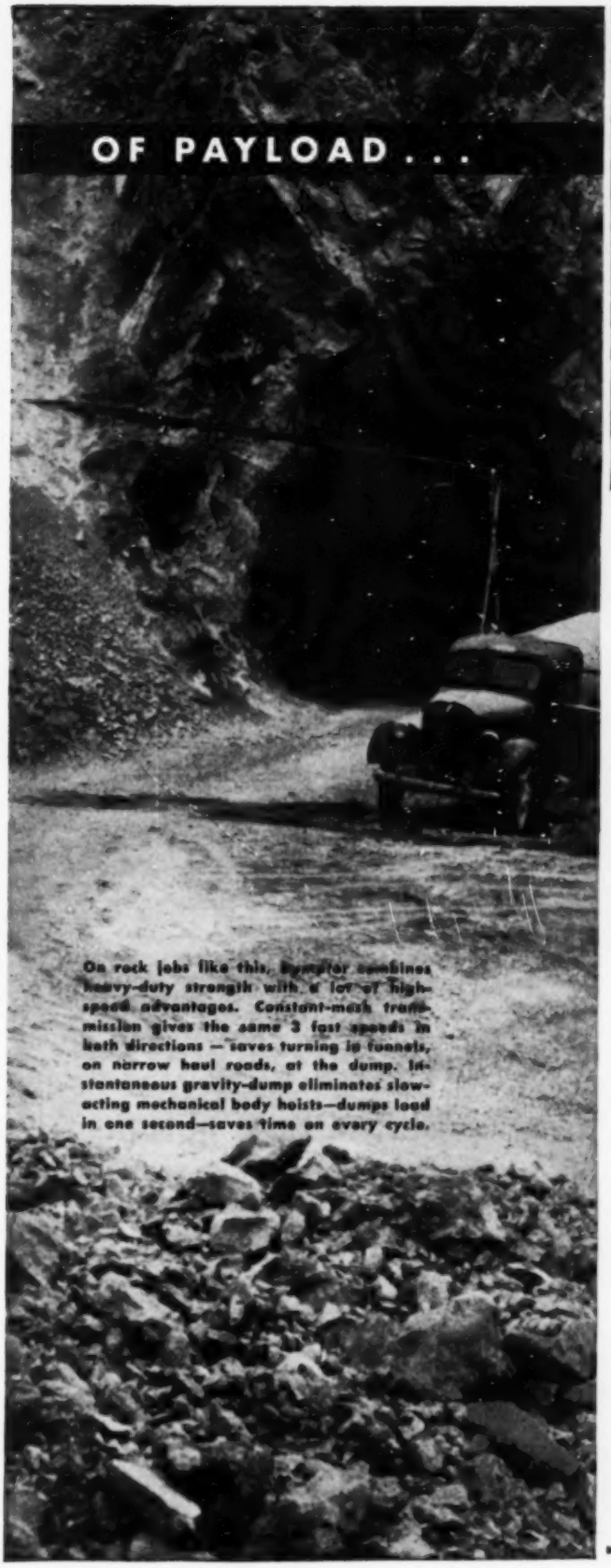
Help to lower power consumption!

Do *not* require heating for application!

Save you money!

Learn more about ALL-WEATHER Sinclair JET LUBRICANTS and how they can help in your heavy-duty work. Contact your nearest Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N.Y.


YOU GET A
TON
OF DUMPTOR®
STRENGTH
FOR EVERY TON



On rock jobs like this, Dumptor combines heavy-duty strength with a lot of high-speed advantages. Constant-mesh transmission gives the same 3 fast speeds in both directions — saves turning in tunnels, on narrow haul roads, at the dump. Instantaneous gravity-dump eliminates slow-acting mechanical body hoists—dumps load in one second—saves time on every cycle.

When you're loading ½ to 2½ yards of rock at a pass, your hauling units need plenty of strength to last. With Koehring heavy-duty Dumptor, there's more than a ton of net vehicle weight for every ton of payload capacity. Sides, ends and bottom of all-welded body are heavily-reinforced with 5 and 8" channel ribs. Double-strength multiple rib-reinforced bottom cushions shocks of rock loading. Stationary or free-swinging kick-out pan adds another ½" steel plate to Dumptor bottom for extra protection.

There's plenty of strength, too, in the Dumptor chassis to take the constant pounding of heavy loading and rough off-road hauling. Rigidly-trussed 8" ship channels make up the main frame. 4" heat treated alloy steel drive axles are protected by one-piece cast-steel housing. "I"-beam steering axle is cast alloy steel. There are no leaf springs — just one big, double-coil chassis spring on the steering axle — none on drive axle. Big drive tires eliminate the need for more springs — absorb loading and hauling shocks, save spring maintenance.

Even with all this heavy-duty construction, Koehring Dumptor has over 6 HP per ton of loaded weight — accelerates fast, pulls through soft ground and up grades with less shifting — climbs 24% grades fully loaded. See what these Dumptor advantages can mean in more work-time, less down time on your jobs. Call Koehring distributor for full details, or send for catalog.

KOEHRING Company

Milwaukee 16, Wisconsin

Subsidiaries: JOHNSON • PARSONS • KWIK-MIX

THE NEW FLETCHER

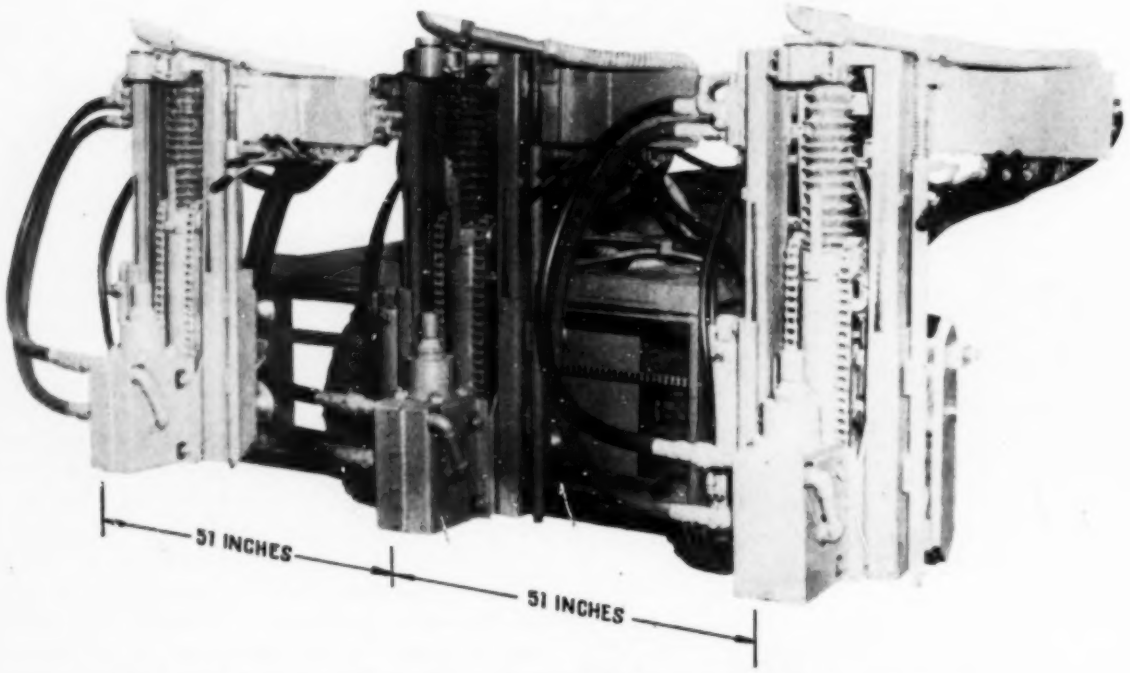
Hydro-Slide ROOF CONTROL DRILL

BRINGS YOU

ONE MAN

ROOF BOLTING

ONLY 5 FT. WIDE — WILL INSTALL 3 BOLTS FROM 1 POSITION — SINGLE HYDRO-SLIDE HEAD SHIFTS 51 INCHES TO EITHER SIDE OF CENTER.



Would YOU like to cut your roof bolting installation costs IN HALF?

With high speed drilling, high speed tightening, and now, high speed positioning, the average mine can easily keep up its roof control program with a single drill operator — and a FLETCHER HYDRO-SLIDE ROOF CONTROL DRILL. Just look at what this machine will do!

1. **DRILL** at unbelievably high speeds—from 1 foot per minute in sandstone to over 14 feet per minute in slate.
2. **TIGHTEN** bolts in 3 to 5 seconds.
3. **POSITION**, bolt to bolt in 5 to 15 seconds.
4. **TRAM**, room to room in 30 to 120 seconds.

Models 35", 48", and 57" high with feed from 37" to 66".

J.H. FLETCHER & CO.

DEPT. C P.O. BOX 353 • HUNTINGTON, W. VA.

...with TYCOL lubricants on hand!

Coal preparation plants are solving a basic lubrication problem!

In one instance, 20,000 tons per day are processed for coking. Yet, *one* gear lubricant – Tycol Apreslube – serves throughout! Rather than chance a costly error by stocking and using eight to ten different lube oils, this operator found Apreslube ideal for literally hundreds of gears – worm, spur, and herringbone – in all sizes. Result? Simplification ... and longer gear service! Apreslube's EP properties reduce wear to a minimum ... other features combat moisture introduced through "breathing action".

More details? Contact your nearest Tide Water Associated office!

Over 300 Tycol industrial lubricants are at your disposal ... engineered to fit the job!

TYCOL
INDUSTRIAL LUBRICANTS

Boston • Charlotte, N. C. • Pittsburgh
Philadelphia • Chicago • Detroit
Tulsa • Cleveland • San Francisco
Toronto, Canada

TIDE WATER ASSOCIATED OIL COMPANY
17 BATTERY PLACE · NEW YORK 4, N. Y.

REFINERS AND MARKETERS OF VEEDOL ... THE WORLD'S MOST FAMOUS MOTOR OIL

1878 75 1953
YEARS OF ELECTRICAL PROGRESS

You get long service life, low brush wear by using G-E commutators—they're stable

Low-maintenance commutator operation depends largely on the care involved in assembling copper and mica segments into a perfect cylinder—and keeping them there. For when they start whirling up to 50 mph inside a mine locomotive's traction motor, they either stay put or you're in for trouble—short brush life, excessive commutator wear, possible flashover.

That's why it pays to specify General Electric commutators for your G-E mine locomotives. They're stable. Their shells and caps, of sufficient strength to transmit tons of pressure, hold segments firmly in place under varying conditions of load, and help keep your mine locomotives in continuous operation. This, plus selection of materials best-suited for the job, assures you the best commutators you can buy for your G-E mine locomotives.

To get top performance—"original equipment" performance—from your G-E mine locomotives, always specify genuine G-E commutators and commutator parts. For full pricing and product information, contact your nearest G-E Apparatus Sales Office. General Electric Company, Schenectady 5, N. Y. 128-13

WHAT DETERMINES COMMUTATOR LIFE?

The most important factor in long commutator life is the stability of its brush-riding surface. To assure stability in G-E commutators, silver-bearing copper, high-grade mica and steel parts are teamed with expert workmanship and advanced manufacturing processes. Just the right amount of a suitable binder is used with the mica to reduce slipping and shrinking. Commutator assembly bolts are carefully tightened to give long satisfactory service with a minimum of attention.

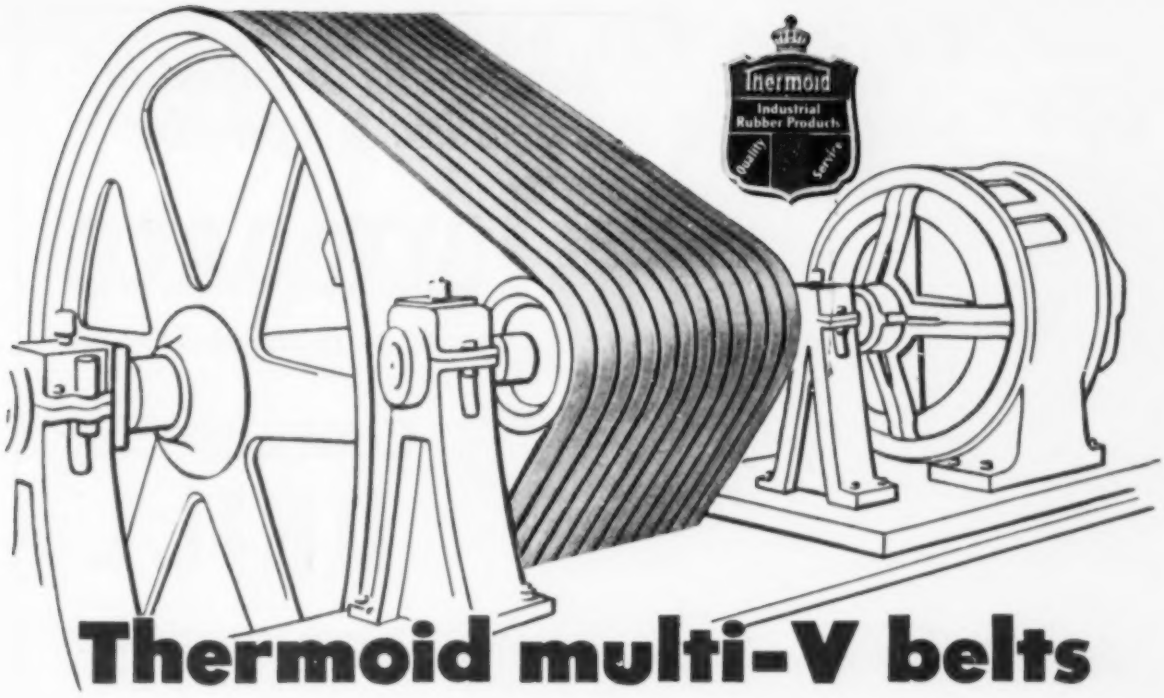
You can put your confidence in—

GENERAL ELECTRIC

"Jim says Bethlehem Spikes don't fly when hit, because of their sharp points.

He ought to know, working with track crews day after day."

BETHLEHEM STEEL



Thermoid multi-V belts

pre-stretched for non-slip performance

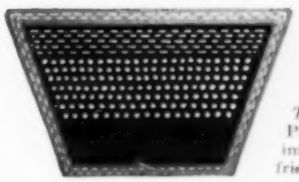
When you use Thermoid *Pre-stretched* Multi-V Belts, you can be sure of maximum power transmission, economical non-slip performance and extra long belt life.

Thermoid Multi-V Belts withstand moisture, abrasion and repeated shock loads.

They're built to take it—specially designed to resist internal friction and heat.

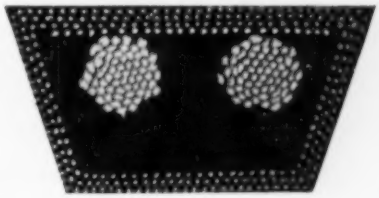
Your Thermoid Distributor can help you with power transmission problems, whether you use Multi-V, F.H.P. or Flat Transmission Belts.

It pays to specify Thermoid.



Thermoid A, B and C Sections Plied cord construction, latex impregnated to reduce internal friction and heat build up.

Thermoid D and E Sections Grommet type construction assures lower permanent stretch, greater flexing ability and shock absorption.

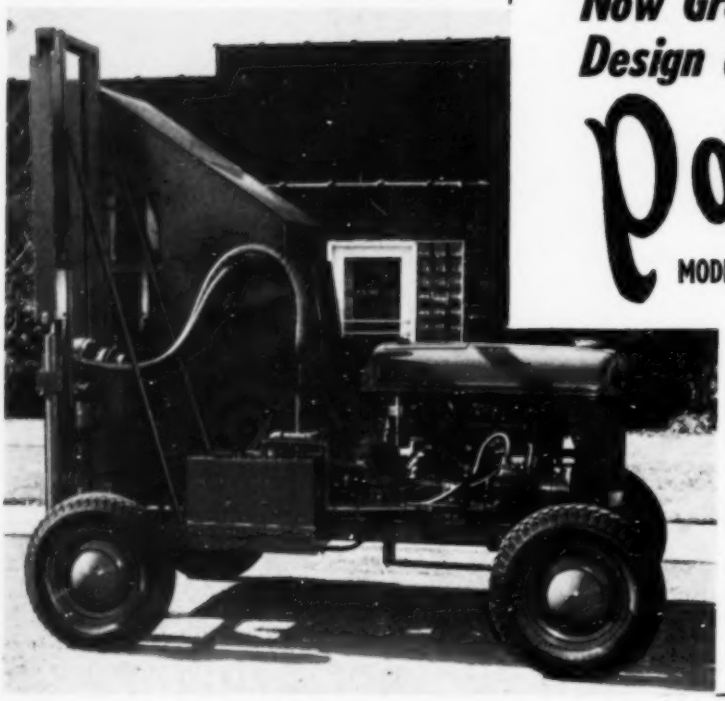


Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



Now Greatly Simplified in Design and in Operation

Parmanco

MODEL 51-53 SELF-PROPELLED · HYDRAULIC

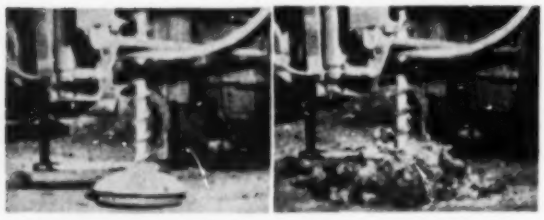
Coal and Clay DRILL

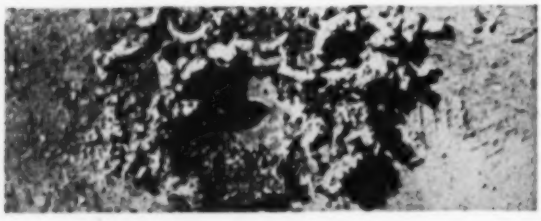
•

EASIER MAINTENANCE
LESS DOWN-TIME

•

HYDRAULIC FEED
FINGER-TIP CONTROLLED
FLUID MOTOR FOR AUGER ROTATION





NEW AUTOMATIC CUTTINGS SHIELD AND GUIDE

Blast holes are kept absolutely clean from cuttings. Picture shows how a dam is formed about the blast hole, excluding casual surface water.

Simplified is the word for this one-man operated drill. Re-designed practically throughout to give you added drilling cost savings.

The Parmanco Model 51-53 takes the hardest part out of drilling. Positive Hydraulic Feed gives right pressure for maximum drilling speed. More than thirty bearings and working parts have been eliminated giving operator more drilling time with less down-time. Enclosure for operator optional at extra cost.

This unit will drill 2½ inch holes to a speed up to 7 feet per minute in No. 5 coal. It will also handle 4¼ inch augers up to 25 feet in depth.

Looking down on New Automatic Drill-Cuttings Shield and Guide located at the right of driver's seat.

PARIS MANUFACTURING COMPANY • PARIS, ILLINOIS

ALL THREE CUT MINING COSTS WITH TIMKEN® BEARINGS

TIME-OUTS for maintenance and repairs mean higher production costs per ton of coal. Mining machines like these must be rugged, dependable—that's why manufacturers specify Timken® tapered roller bearings at vital points.

Timken bearings take even the heaviest cutting loads. Their tapered construction takes all radial, thrust and combination loads. Line contact adds extra load-carrying capacity. True rolling motion and extremely smooth surface finish make friction negligible.

Maintenance and lubrication costs are cut, too. Timken bearings hold housings and shafts concentric, make closures more effective. Lubricant stays in—coal dust and dirt stay out.

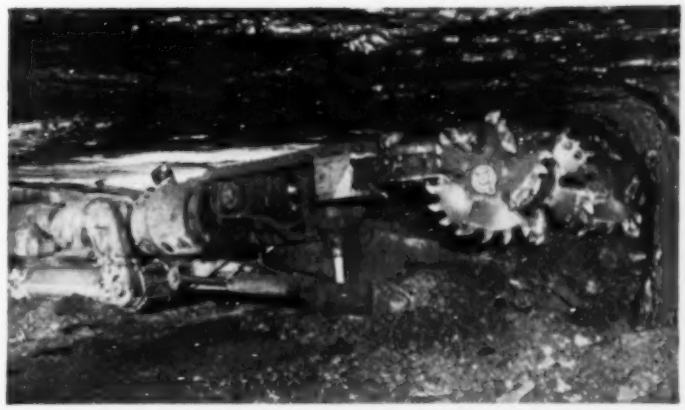
Timken bearings are case-carburized—have tough, shock-resistant cores and hard, wear-resistant surfaces. Result: they take the toughest loads, normally last the life of the machine.

To insure uniform high quality, the Timken Company makes its own bearing steel. Get all the Timken bearing advantages in the machinery you build or buy. Make sure the trade-mark "Timken" is stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO."

TIMKEN

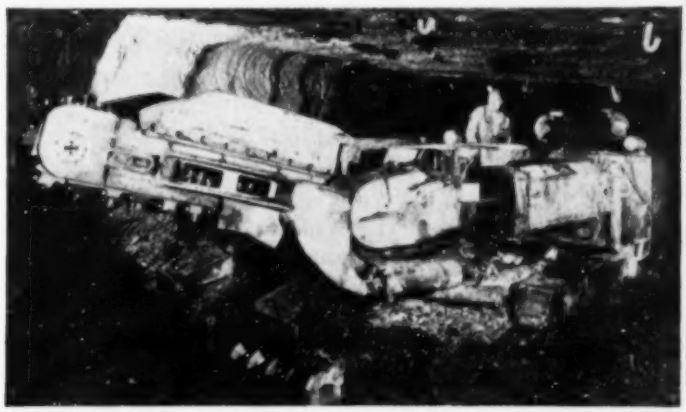
TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS



64 Timken bearings keep this Lee-Norse "Miner" on the go under the severest operation conditions.

Jeffrey's COLMOL uses 178 Timken bearings at vital points to insure trouble-free operation.

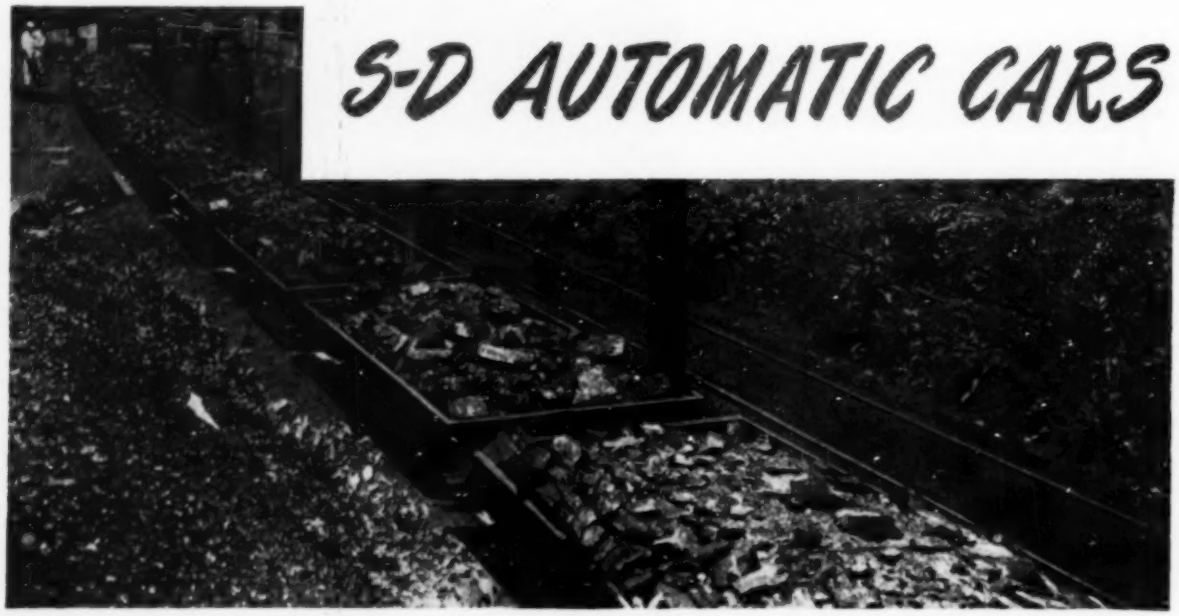


47 Timken bearings are used in this Joy 4 JCM continuous miner for long life with minimum maintenance.

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ◇ AND THRUST →◇← LOADS OR ANY COMBINATION

Reduce Man-Hour Cost these 5 ways with...

S-D AUTOMATIC CARS



1. **Eliminate all manual operation at tipple . . .** S-D Automatic Drop Bottom Cars discharge the coal automatically. When each car in trip approaches opening between rails over Surge Bin, an automatic tripping device unhooks the drop bottom doors. As each car leaves Surge Bin a closing device automatically closes and re-hooks the doors as trip continues back to mine for re-loading.

2. **Use fewer trip crews.** The non-stop haulage provided by S-D Automatics gets longer trains of cars back to the mine faster.

3. **Operate preparation plant with only one shift.** Usually, a one shift operation at the preparation plant will balance a two shift operation in the mine. The Surge Bin continues to take the coal as it is mined, storing it for smooth flow to preparation plant during a one shift operation.

4. **Prevent your preparation plant crew from standing idle because of delays at the face.** With S-D Automatics and an adequate Surge Bin, your preparation plant continues to take coal from the Surge Bin when there is a delay at the face.

5. **Avoid the costly down time of crews standing idle at the face because of delays at the preparation plant.** Remember, when there is a delay at the preparation plant, the Surge Bin continues to take coal as it is mined.

Have one of our engineers show you how much money S-D Automatics can save you by reducing man-hour costs. Without question, S-D Automatics offer you the lowest cost method of main line haulage!

SANFORD-DAY IRON WORKS

KNOXVILLE, TENNESSEE

The strongest rack bar makes the toughest jack

A ratchet jack like the Duff-Norton all-purpose 516 MT is no stronger than its rack bar, the notched steel "heart" that moves up and down holding the load. The forged steel rack bar on this 5-ton capacity coal mining jack is stronger and tougher than the rack bar on any other ratchet jack of this type. It's *stronger* because it's *larger!*

Next time you see a Duff-Norton jack, examine the rack bar; you'll notice it's oblong like this ▬. Then look at the rack bar on any other make ratchet jack. It's smaller, like this ■.

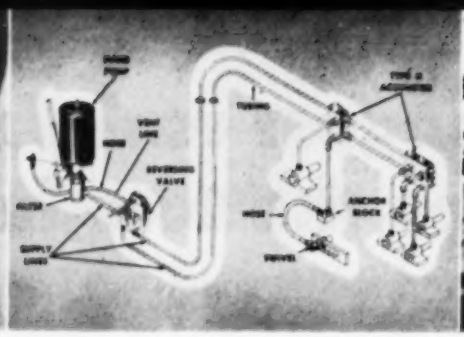
So get the most and best for your money with a Duff-Norton Jack.

Ask your distributor for information about Duff-Norton Jacks for coal mines. There's a jack for every lifting, pulling, and pushing job . . . or write the world's oldest and largest manufacturer of lifting jacks for your copy of "A Handy Guide for Selecting Duff-Norton Mine Jacks." Ask for bulletin Ad 10-J, The Duff-Norton Manufacturing Co., P.O. Box 1889, Pittsburgh 30, Pa.

Long a favorite with coal miners is the 516 MT. It can raise 5 tons up to 9½ inches, is only 16 inches high when closed, has the famous oblong rack bar for greater strength and dependability.

DUFF-NORTON Jacks

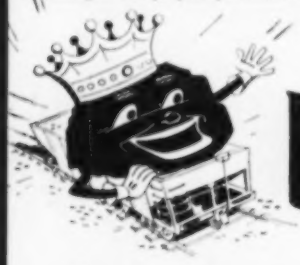
"Giving Industry A Lift Since 1883"



Conveyor Belt Rollers get positive lubrication with Alemite Model 6679-J lever gun. Hi-pressure delivery flushes bearings completely. Alemite loader pump fills gun easily, quickly—eliminates air pockets.

Alemite Accumeter Lubrication Systems serve hundreds of bearings from one central point—while machines are in operation—*no shutdowns necessary!* System is fully enclosed, protected from grit, dirt.

Here an 8' Shaker Assembly is lubricated with a 30 lb. capacity Alemite Bucket Pump, Model 6712. Develops 7,000 lbs. pressure. Dynamic Primer assures positive delivery of heaviest greases.



King Coal Must Roll...

from mine to car, Alemite "Friction Fighters" smooth the way!

Up a 700' Conveyor—through crusher, shaker, washer, drier—350 Tons an Hour!

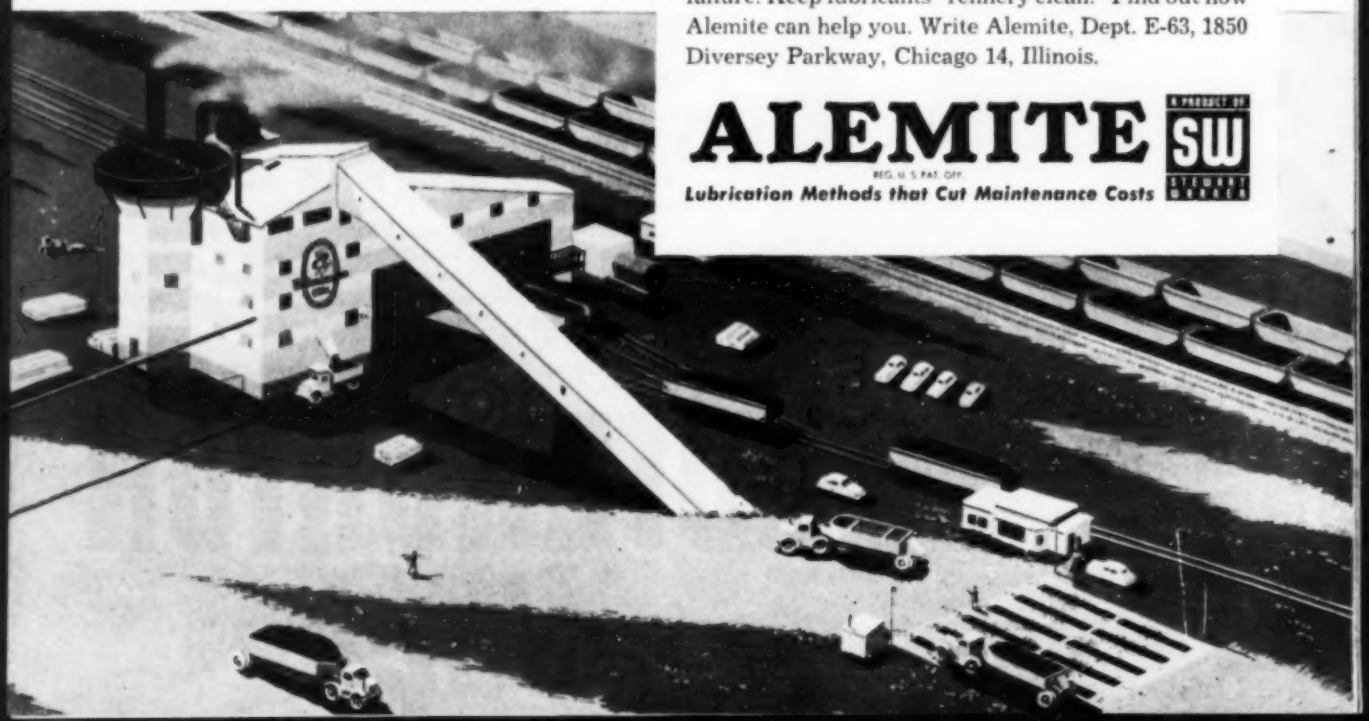
Here at the Wilmington Plant of the Northern Illinois Coal Corporation a million tons of low-ash coal are processed every year, sorted in 10 sizes, and shipped. Here, in this high-speed operation, Alemite lubrication methods and equipment protect bearings exposed to hazards at every turn—dust, grit, extremes of hot and cold, wet and dry—all the dangers found in any coal processing plant.

Actual on-the-job Proof—Alemite Best for ALL types of machine motion. Chain drives, reciprocating parts, conveyor drives, all shafts, heavy or light—any and all coal processing machinery is best lubricated by Alemite. Under any conditions, there is a better Alemite method for transferring, loading or applying grease. And the proof is in the overwhelming majority of major plants that have chosen Alemite to do the job!

Alemite Slashes Downtime—Boosts Tonnage! Alemite lubrication methods of transferring, loading and applying grease reduce downtime and chances of bearing failure. Keep lubricants "refinery clean." Find out how Alemite can help you. Write Alemite, Dept. E-63, 1850 Diversey Parkway, Chicago 14, Illinois.

ALEMITE
REG. U. S. PAT. OFF.
A PRODUCT OF SW STEWART-WARNER

Lubrication Methods that Cut Maintenance Costs



Eaton 2-Speed Truck Axles

More than a Million-and-a-Half in Trucks Today!

combine both pulling power and speed with low operating cost

Pulling out under full load, climbing grades, snaking through traffic, making time on the open highway—the right gear ratio available for every situation means quicker trips, more pay-load miles at lower cost, more miles in the life of the truck. Ask your dealer to explain why trucks with Eaton 2-Speed Axles do more work for less money.

EATON AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves •Tappets •Hydraulic Valve Lifters •Valve Seat Inserts •Jet Engine Parts •Rotor Pumps •Motor Truck Axles •Permanent Mold Gray Iron Castings •Heater Defroster Units •Snap Rings Springtites •Spring Washers •Cold Drawn Steel •Stampings •Leaf and Coil Springs •Dynamatic Drives, Brakes, Dynamometers

PARALLELISM

ACCURATE PARALLELISM between the rollers and the matched thrust plates is repeated in the parallelism between the separator slots and the rollers themselves—all adding up to quietness, equalized wear and longer life.

THRUST
RADIAL

RIGHT ANGLE
Roller Ends, precisely square to avoid end-rub, oscillation and side-shock.

- **RIGHT ANGLE**
Bearing Surfaces with parallelism that results in unwavering right-line rolling.

- **RIGHT ANGLE**
Separator Slots accurately machined to prevent roller skew, slide and uneven wear.

Held to extremely close limits of parallelism, every roller—every race—every thrust plate in a Rollway Bearing is an engineering masterpiece of matched precision and right-angle trueness. As a result, friction losses are low—load capacity and service life high.

Rollway Radial and Thrust Bearings offer the widest selection in types and sizes, available for quick replacement through authorized distributors. Consult your classified phone directory under BEARINGS.

Our engineers are available without cost or obligation to assist you in selecting the correct Rollway Bearing for your needs. Call your nearest Rollway sales office.

SALES OFFICES

Syracuse	Houston
Cleveland	Chicago
Detroit	Philadelphia
Boston	Toronto
Pittsburgh	Los Angeles

ROLLWAY
BEARINGS

Complete Line of Radial and Thrust Cylindrical Roller Bearings

Longer Service Life Pays Off

Long service life means plenty to a G.I. . . . and it pays off in the coal fields too. Especially when you're talking wire rope.

That's why mining men look to J&L for wire rope that fits their equipment requirements . . . has the strength, flexibility and toughness to stay on the job and help hold down operating costs. The results of J&L Wire Rope service life are reflected on the profit sheet in terms of minimum downtime for re-rigging, high production and an increase in tons mined per wire rope dollar.

J&L Wire Ropes are quality controlled from the iron ore to the final stranding and closing operations. They are the combination of 100 years of steel-making experience, top-flight wire rope engineering and the most modern production equipment. The result—every wire, every strand, every J&L rope is "precisionbilt" for maximum service.

There's a J&L Wire Rope designed to give *you* cost-cutting service life on *your* equipment. Just ask your J&L representative to check your operation now.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH

Left Fork Fuel Company finds that

4 belts reinforced with "Cordura" solve tough transport problem...end work stoppages

"CORDURA" REINFORCED BELT NO. THREE, 2,100 feet long, with metal roof 18" above the belt. This 30-inch, 5-ply belt carries 1,000 tons of coal per 16 hours. The pay load is transferred at the junction points by overlapping belts. The entire installation requires the attention of only one man per eight-hour shift.

"Watch for 'Cavalcade of America' on television."

Impassable roads in bad weather made the transport of coal from the mine to railway spurs a major problem for the Left Fork Fuel Co., of Quinwood, West Virginia. Trucks often "bogged down" in mud, and stoppage of 1,000 tons of coal production per day resulted.

Engineers solved the problem by recommending installation of 4 "Cordura" reinforced conveyor belts. A total length of 9,240 feet of belting was required. These belts were manufactured by the B. F. Goodrich Company. They were installed in August 1952 and have operated continuously with minimum maintenance.

The high strength of Du Pont Cordura* High Tenacity Rayon makes possible belting that's stronger yet thinner . . . belting that troughs better. And its low stretch saves costly shutdowns for take-up and resplicing.

Before you order your next conveyor belt, be sure to inquire about the use of "Cordura" rayon in belts. We'll send you the names of suppliers . . . together with full information about "Cordura" rayon. Just write for your free copy of the booklet "Sinews for Industry" to: Textile Fibers Dept., Room 2520-C, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del. (Offer good only in U. S.)

*REG. U.S. PAT. OFF.

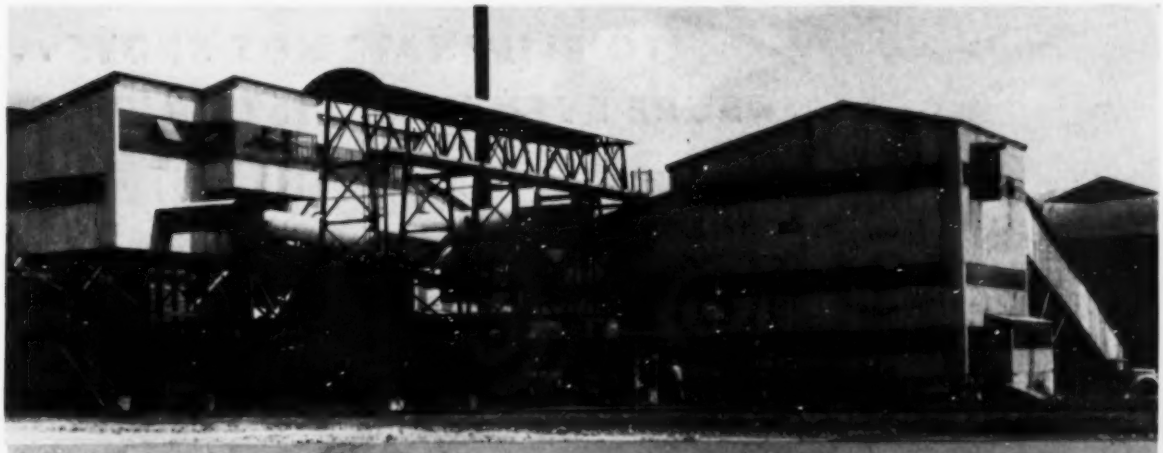
Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

DU PONT

BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

Quality Design for a Quality Product



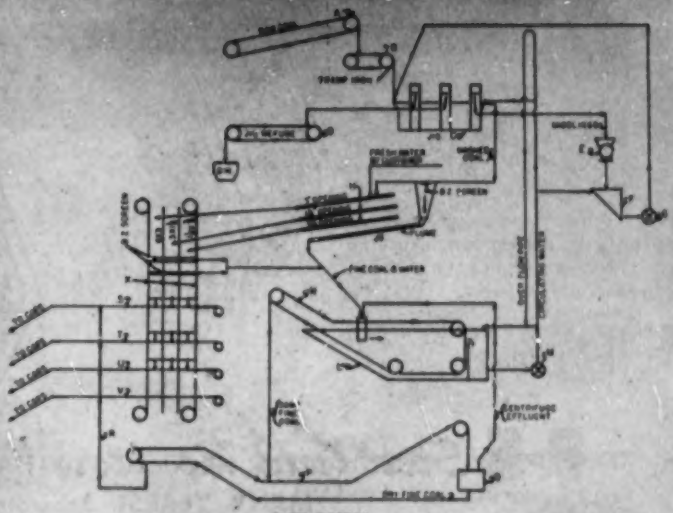
TOPGROUND PREPARATION

For years Jeffrey has been designing and erecting tipples as well as furnishing most of the equipment being used to prepare coal to meet exacting customer requirements.

The tipple illustrated above is typical and was designed, built and equipped by Jeffrey. The flow chart at the right shows the location of Jeffrey equipment in the plant and chronological sequence of operation.

Jeffrey also makes individual units such as Washers, Crushers, Feeders, Screens, Picking Tables, Loading Booms, and Conveyors to extend or modernize existing plants.

Write for Catalog 815-A



FLOW DIAGRAM

KEY TO EQUIPMENT

A—Belt Conveyor Feed to Magnetic Separator
C—Jig
D—Jig Refuse Conveyor
E—Crusher
F—Middlings Sump
G—Middlings Pump
H—Dewatering Screen
J—Flumes to Settling Tank
K—Mixing Conveyor
L—Settling Tank
M—Pump and Piping
N—Settling Tank Conveyor
P—Fine Slack Conveyor
R—Slack Conveyor
S—Loading Boom—Egg
T—Loading Boom—Junior Egg
U—Loading Boom—Stoker
V—Loading Boom—Slack

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

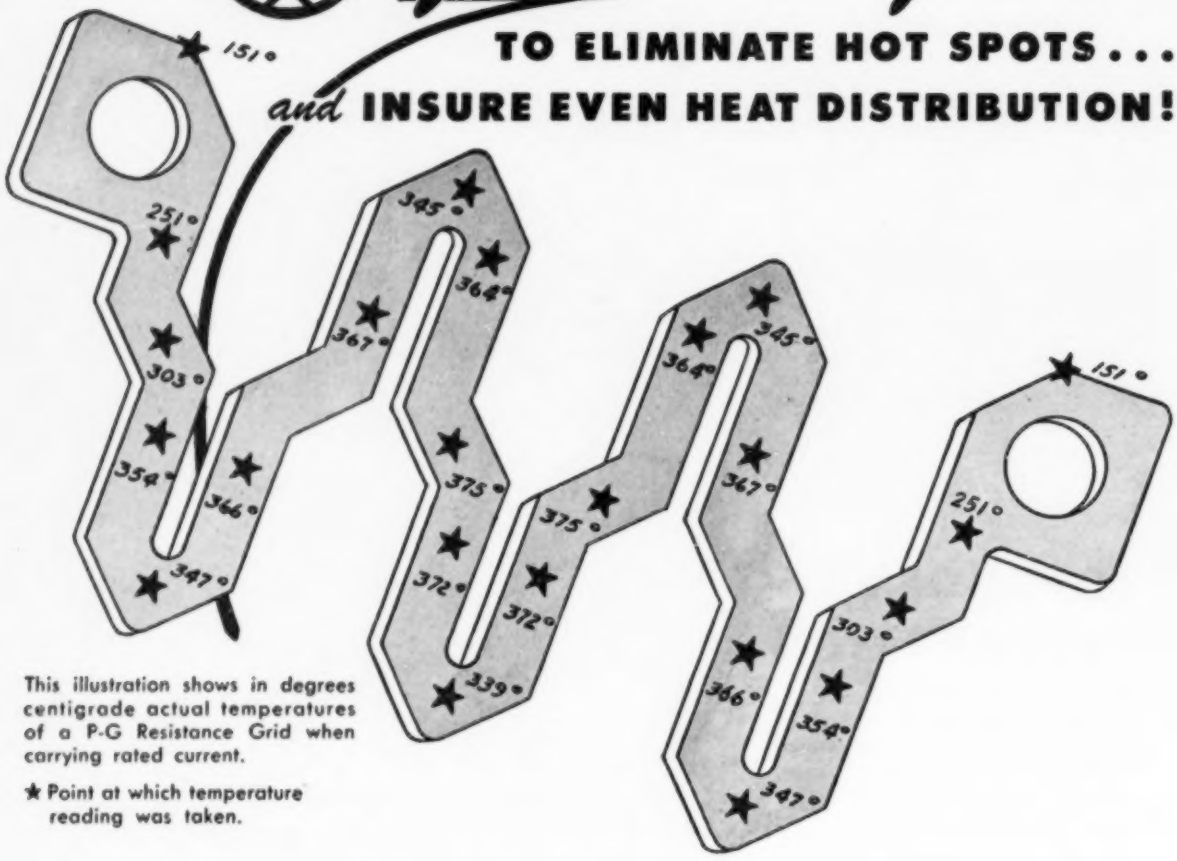
PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED

. . .IT'S A JOB FOR JEFFREY!

P-G Grid Designed

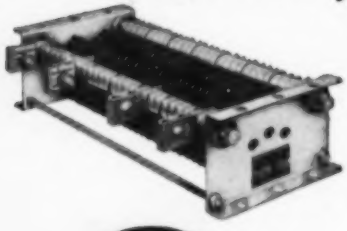
TO ELIMINATE HOT SPOTS... and INSURE EVEN HEAT DISTRIBUTION!



This illustration shows in degrees centigrade actual temperatures of a P-G Resistance Grid when carrying rated current.

★ Point at which temperature reading was taken.

P-G *Steel Grid Resistors* HAVE DEMONSTRATED THIS FOR MANY YEARS! Laboratory tests of temperature distribution on "Type T2 Resistance Grids" at rated current indicate extremely uniform temperatures over the entire grid surface. Note also, that temperatures at points of contact are much cooler than at any other point on the entire grid. You, too, can obtain better results by specifying P-G for your next application.



Steel Grid Resistors* for COAL MINES *Since 1915

P-G

The Nonbreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY

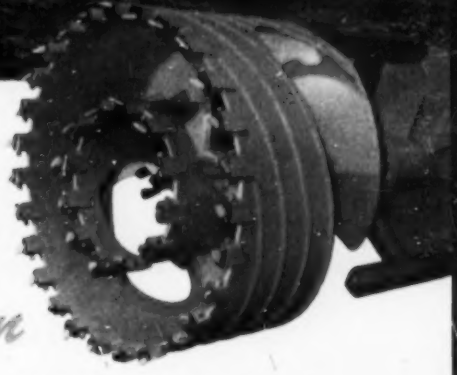
• ESTABLISHED 1892 •

221 WEST THIRD STREET, CINCINNATI 2, OHIO

COMPTON Model 48 Coal Auger

Recovers coal up to 208 ft. from the pit wall

. . . regardless of overburden



The Compton Model 48 Coal Auger is designed to give you maximum efficiency at low cost. CHECK THESE FEATURES!

1.—Auger sections racked on frame—ready for transfer to operating position by hydraulically controlled synchronized winches in a matter of seconds.

2.—Hydraulically-operated pilot pan eliminates spillage between machine and high wall.

3.—Entire unit is self-contained including elevating conveyor.

4.—Hydraulically-controlled swivelling discharge turret chute permits uniform trimming of trucks.

5.—Hydraulic jack legs (with self-leveling pontoons for better floatation) permit drilling up to 208 feet without misalignment . . . also permits drilling vertical overlapping holes for varying seam thickness.

COMPTON CUTTING HEAD

EXCLUSIVE WITH COMPTON AUGERS . . . BUILT-IN SPIDER ASSEMBLY ON NON-CLOGGING HEAD RESULTS IN INCREASED PRODUCTION BY DRILLING STRAIGHTER HOLES WITH LESS FRICTIONAL DRAG.

MODEL 48 SPECIFICATIONS

Length: 48 feet; Weight: Approx. 36 T.
Carries eight 26 feet auger sections.
Required pitwidth: 50 feet
Power: 300 HP Diesel Engine
Hydraulic frame jack lift: 66" or 120"
Auger diameters: 28" to 48"
Possible drilling depth: 208 feet

Consult a Compton Engineer for Details

Compton, Inc.

ORIGINATORS OF COMPTON LUMP RECOVERY HEADS

BOX 1946 – PHONE 4-6384 CLARKSBURG, WEST VIRGINIA

4 Powerful Reasons why costs go down with CHEVROLET ADVANCE-DESIGN TRUCKS on the job

EXTRA POWER WITH ECONOMY! More hauling power, greater economy! That's the result of new 7.1 to 1 compression ratio of improved Loadmaster engine on 5000 and 6000 Series heavy-duty and forward control models—optional on 4000 Series heavy-duty trucks. Thriftmaster engine in light- and medium-duty models provides traditional Chevrolet economy.

ENGINEERED FOR THE JOB! With Chevrolet, you buy a truck that is exactly right for the job. Not too big. Not too small. You get a truck engineered from the ground up with your job in mind—with the right tires, springs, axle, clutch and engine. You get a truck that will stick on the job day after day, and do your work at lowest cost.

BUILT TO LAST! The extra-sturdy construction of Chevrolet advance-design trucks means longer life, even lower costs. Now, Chevrolet trucks are brawnier than before—with heavier, more rigid frames, with greater ruggedness and stamina built right in. These are the toughest and the sturdiest Chevrolets ever.

THE LINE LISTS FOR LESS, TOO! With all the solid superiorities that Chevrolet offers—with all their special features and advantages—this great line of haulers lists for less than any other trucks of comparable size and specifications. See your Chevrolet dealer. Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTIPANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

CHEVROLET
first in demand
in value
in sales

RECIPE FOR CLEAN COAL

Photographed on the job, East Bernstadt, Kentucky

Operators Getting Top Market Prices With Dependable Seco Screening Equipment

If you think that you need invest a fortune for equipment to turn your R. O. M. into clean coal in the wanted sizes, read this on-the-job report.

In the photograph above, the Seco scalping screen located at the top of the loading ramp is removing lump coal from 95 to 100 T.P.H. of mine run, and making another size as required which goes into the second bin. In the second circle is another Seco sizing screen taking the thru's from the bottom deck of the scalping screen. This Seco removes the slack to produce a third size of clean, properly graded coal into the end bin.

Mr. John B. Gordon, owner of the Gordon Coal Company, is enthusiastic about the hour after hour, year after year performance of their Seco vibrating screens. Their low original cost and low upkeep make it possible to screen coal for pennies per ton.

Plan now to get your share of the better profit market . . . the market for clean, properly sized coal. Send for Seco Coal Bulletin #41.

SECO
TRUE CIRCULAR ACTION
VIBRATING SCREENS

How Many Sizes of Clean Coal Would You Like to Produce?

A Seco field representative will gladly discuss your coal cleaning and sizing problems with you, and recommend the right Seco screening equipment for your job. No obligation. Over 300 Seco models in single, double, triple and 3½ decks. Write today.

SCREEN EQUIPMENT CO., INC.
1750 Walden Ave., Buffalo 25, N. Y.
In Canada: United Steel Corp., Toronto, Ont.

Decline Conveyor On the

HEWITT-ROBINS

EXECUTIVE OFFICES, STAMFORD, CONNECTICUT

Job for Over 24 Years

EQUIPMENT: Hewitt-Robins Decline Conveyor.

LOCATION: Reitz Coal Company, Mine #5, Windber, Pennsylvania.

MATERIAL HANDLED: 18" maximum size, r.o.m. lump coal.

PERFORMANCE: Probably the first declining belt conveyor to be placed in service, this unit was designed to handle bituminous coal at the rate of 100 T.P.H., down a decline of 112'-0", at a speed of 110' F.P.M.

RESULTS: Installed in 1925 this Hewitt-Robins belt conveyor provided over 24 years of dependable, trouble-free service. The original Hewitt-Robins belt did not need replacement until 1949; the original machinery is still in operation.

Engineering Data

LENGTH OF CONVEYOR: 710' center to center from end pullies.

WIDTH OF BELT: 36"

DECLINE OF CONVEYOR: 112' ... Belt Conveyor hugs the ground surface, in its travel.

CAPACITY: 145 T.P.H.

CHECK FOR INFORMATION ABOUT THESE JOB-TESTED PRODUCTS FOR YOUR OPERATION

CONVEYORS:
- ☐ —Belt
- ☐ —Dock
- ☐ —Mine
- ☐ —Shuttle
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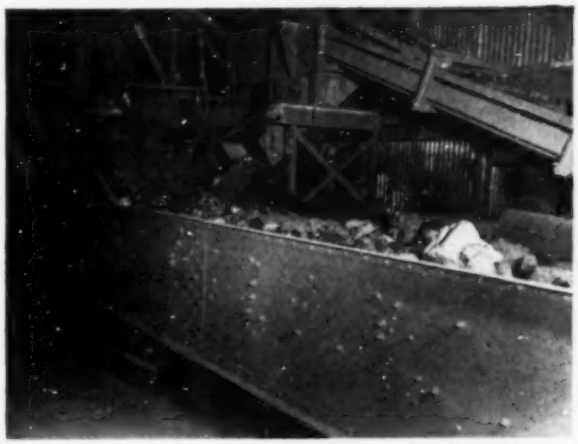

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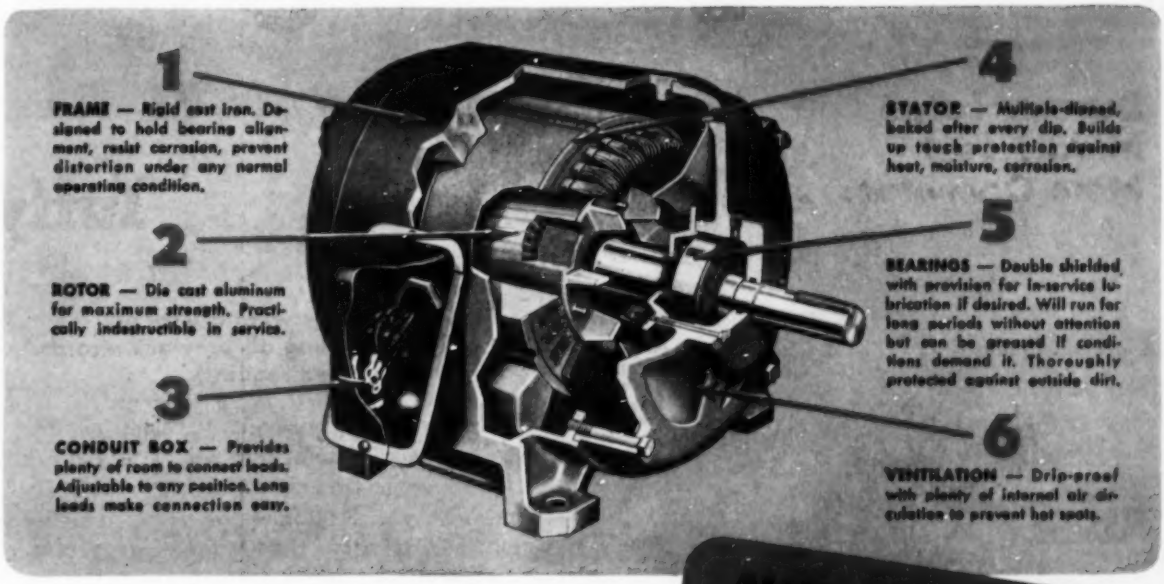
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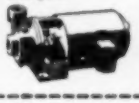

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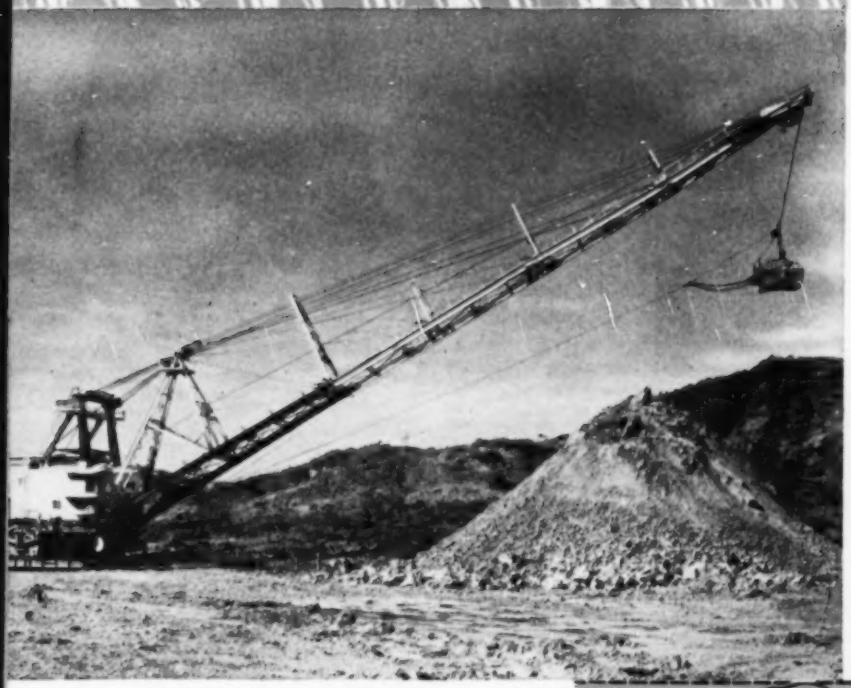

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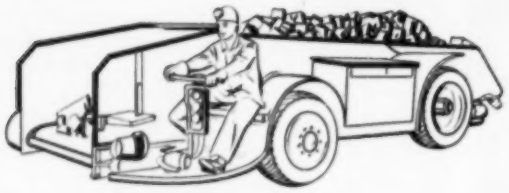

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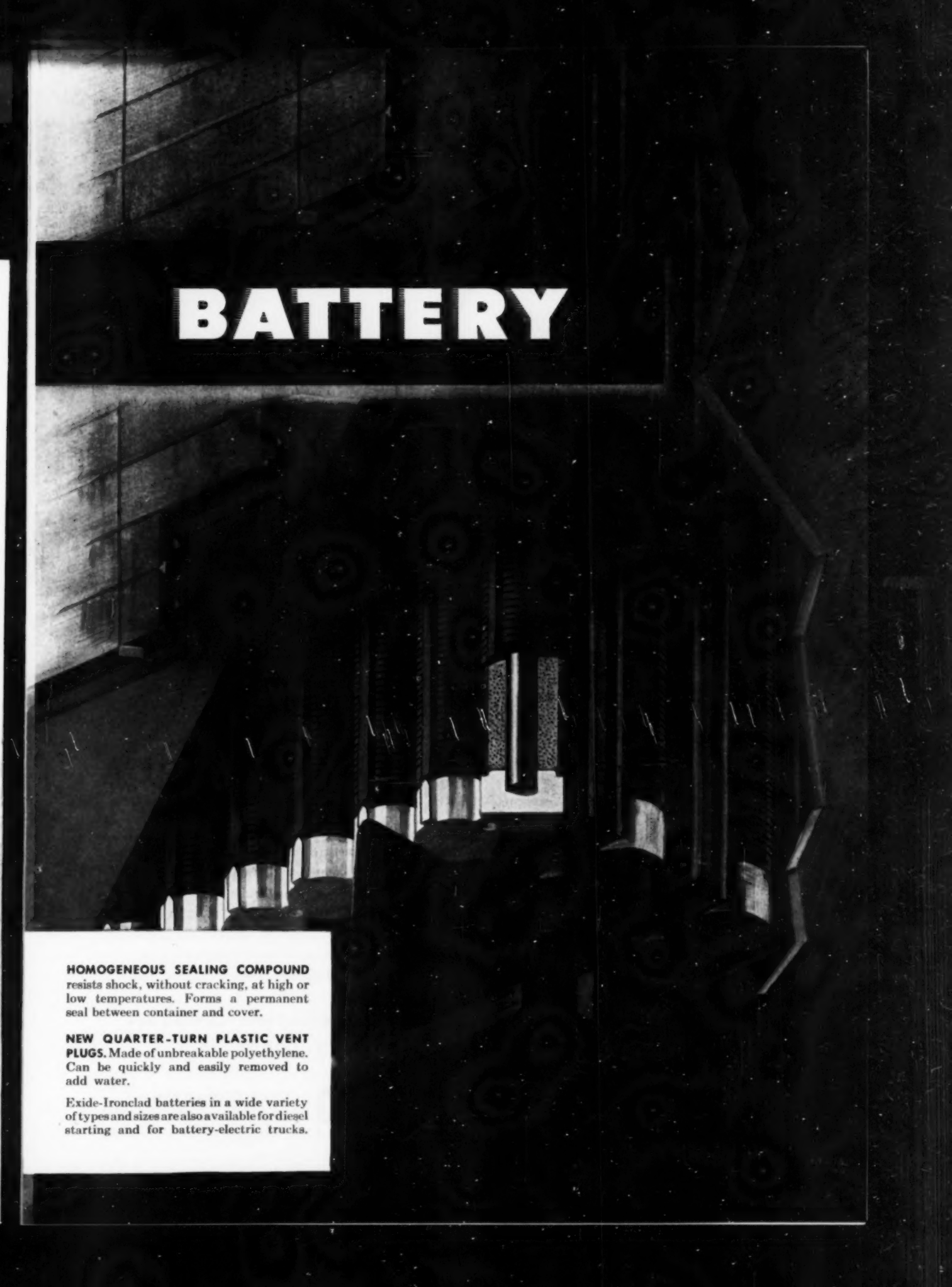

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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

JUNE, 1953

IVAN A. GIVEN, EDITOR

Basic Ingredient

IS A BIG STRIPPING SHOVEL, as an example, merely a cleverly assembled aggregation of steel, copper, rubber and the like, or is it something more? Basically, it is something more—in reality an idea translated into a useful device, because if some man or group of men had not thought of it first it would never have been built. When you get down to brass tacks, in fact, everything is an idea—for example, Appalachian Coals, Inc., this year completing 20 yr of distinguished service to its members, or, in the mine, a drag under a shuttle car to keep the roadway in good condition automatically.

The fact that language tends to fly a little high when the idea of ideas is under discussion does not alter the fact that the most valuable things of all are ideas. Although it is not often expressed that way, the value of all supervisors, managers and executives is measured by their ability to generate and apply ideas, because ideas mean progress and profits. Ideas that will cut cost, heighten quality and promote safety were never more important in coal mining than today. Conscious, continuous effort to generate and apply ideas will pay off now more than ever before. Supercharging the thinking-cap drive is the first order of business today.

First Round

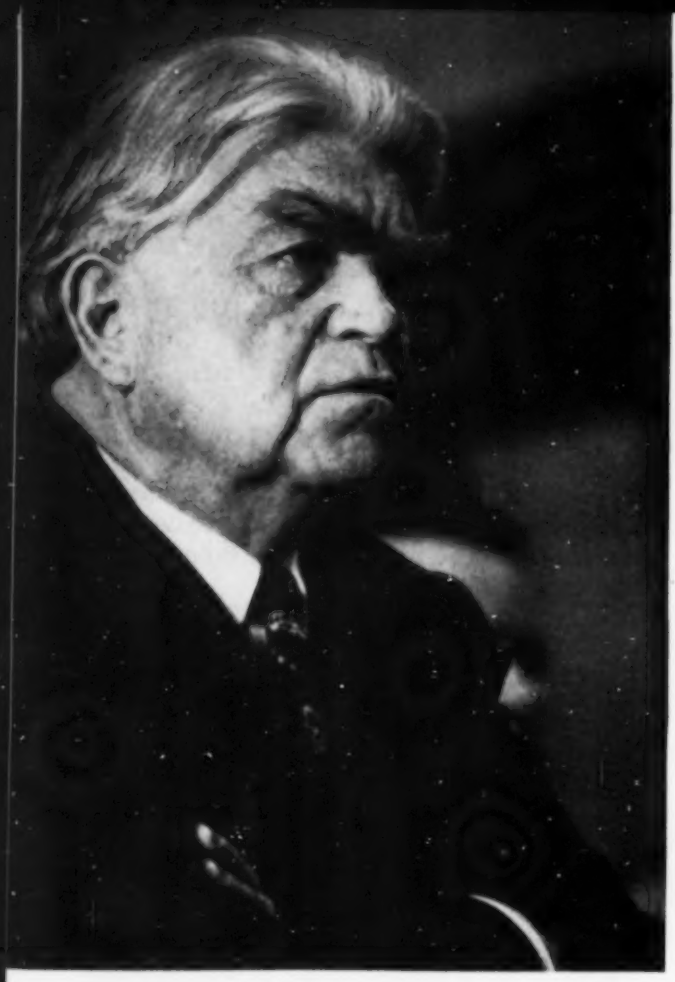
WHETHER OR NOT specific legislation, such as the Simpson bill (H.R. 4294), for curbing the dumping of oil and other products in the United States goes through, the strength of coal's case, and the cases of other industries, can be gaged by the fact that the administration deemed it necessary to have practically all cabinet members testify against the Simpson bill, with two—Benson, of Agriculture, and McKay, of Interior—specifically stating that coal and certain other industries could expect more sympathetic treatment under the present law. So coal has made measurable progress in the first round, and if unrestricted dumping of oil continues, there is real reason to feel that it will succeed in getting specific legislative curbs in the second round if it keeps up the pressure.

Profit or Charity?

TIMES SUCH AS THESE the coal industry is experiencing accentuate a problem that has plagued commercial producers practically since the inception of mining. It is a problem growing partly out of the fact that the industry is made up of a relatively large number of companies and fields competing in common markets, and partly out of a combination of idle-time expense and psychological reaction to even implied threats to take business elsewhere. The problem is, of course, that of getting prices that will return a reasonable profit.

One gag has it that practically all life's pleasures are either illegal, immoral or fattening. At times, it seems that there are somewhat similar roadblocks in the way of getting coal prices commensurate with the value of the product—and coal has an undeniable value which all too often is not reflected in the price. As a result, the coal industry at times looks more like a charitable institution than a commercial enterprise rendering a service for a fair profit. One of the ironies of the situation is that the beneficiaries of coal's charity frequently are users in lusty financial health.

Of course, it is easy to put the finger on the problem. Applying the remedy is quite a different thing, as any sales executive battling for an order can document with chapter and verse. But it would certainly help, after a real effort has been made to cut cost and boost quality, if more emphasis was placed on getting the proper price—even to refusing to sell unless that price was forthcoming. A loss is a loss, whether in the form of profitless distribution of the company's only asset—its coal reserves—idle-time expense or an actual deficit on sales.



Some day, John L. Lewis will step down as UMWA president.

A new man will take over.

How can operators ease the transfer of union power?

How can they make a good start with Mr. Lewis' successor?

How can they win the loyalty of miners for the years ahead?

After Lewis—What?

WHAT WILL HAPPEN when John L. Lewis is no longer president of the UMWA?

Will there be peace in the industry? Or civil war?

Will the man on whom Mr. Lewis' mantle falls be a bane or a blessing?

Can operators smooth the transfer of power to Mr. Lewis' successor?

Make no mistake: Mr. Lewis still stands firm in the center of the stage. And that's not all: He bids fair to stand there for some time to come.

But for once—this once—operators can predict the unpredictable Mr. Lewis. He will pass off the stage. When, nobody knows. But every act played out brings the last scene closer.

From this unaccustomed vantage point—that is, knowing what Mr. Lewis will do, if not when—operators have an opportunity to get set for the future.

Now, not later, is the time to canvass the field and appraise likely candidates for Mr. Lewis' crown.

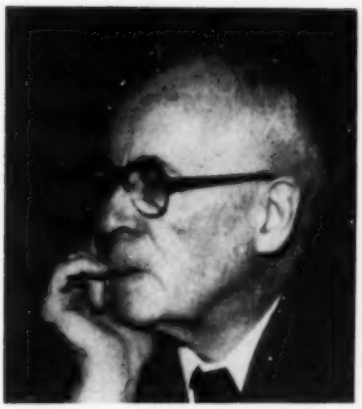
Now, not later, is the time to chart rocks and shoals and lay down a course that will guide the industry through any storms that may lie ahead.

Now, not later, is the time to shape a policy and an attitude toward the union that not only will render operators blameless for any disruption that may mark Mr. Lewis' retirement but, going further to constructive action, may help smooth the transfer of power for the industry, its workers and the public and ensure some stability for the years ahead.

How Long Will Lewis Last?

MR. LEWIS LOOKS AND ACTS like a man who'll be around for some time yet.

He carries himself well. The old firmness still lies in the set of his jaw; in his eyes, the old passion and conviction. In indignation or in thought, the eyebrows, still less gray than the unruly head of hair, beetle as formidably as ever, and the index finger still darts out to dramatize and drive home a point.



MR. KENNEDY? . . . Seasoned negotiator and conciliator. In miners' causes, an able advocate. But getting old.

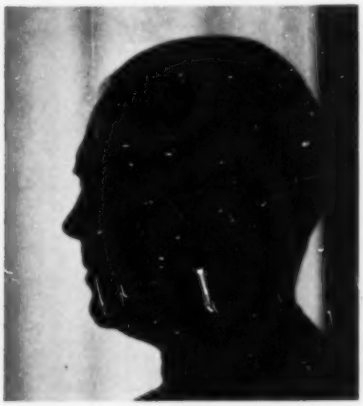
MR. OWENS? . . . Old-line UMWA man, sharing some of Mr. Lewis' traits. Strong following among the miners.

MR. BOYLE? . . . Up-and-coming right-hand man for Mr. Lewis. *Question:* Do the miners know him well?

Who'll Wear Lewis' Crown?

MR. HOPKINS? . . . Mr. Lewis' legal eagle. Unlikely to become UMWA president, but a man to reckon with.

MR. TITLER? . . . Tough, militant district leader. Might carry the day in a convention floor fight.



DARK HORSE? . . . A power vacuum may follow Mr. Lewis' reign. With that, anything could happen.

The sense of humor, sardonic and cheerful by turns, is unimpaired. In amusement or relaxation, the eyes crinkle, a smile ripples across the mouth, and the tough old face softens.

Though by ordinary standards Mr. Lewis has reached an advanced age—73, to be exact—he appears to be in robust health. His hands are steady and his skin is clear. His step is firm and sure; vision, good. No noticeable signs remain of an illness that struck him a year or more ago. He chomps a cigar with manifest relish.

The men who see Mr. Lewis from time to time report that he tires more quickly than he used to. But as long as he lasts he's as tough as ever and when weariness sets in, he calls a halt. Next day, he's as good as new. They report also that his temper flares less often than it once did. Their conclusion: Mr. Lewis guards his health with care and, barring events no one can foresee, he can look to active years ahead.

Photos: Wide World; Bob Phillips; Coal Age.

When Lewis Retires—What?

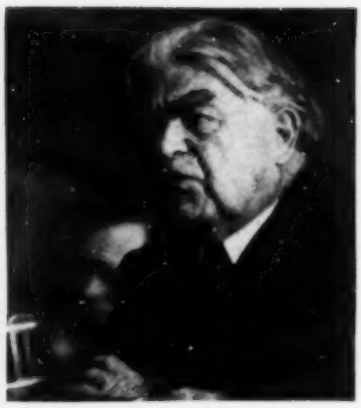
ANYTHING COULD HAPPEN when Mr. Lewis withdraws from the stage.

Guesses among operators and association men run all the way from "Nothing will happen"—in other words, a smooth transfer of power—to "The damnedest dogfight you ever saw!"

Much, of course, hangs on circumstances at the time. If Mr. Lewis should move out today, when the industry is hard pressed for markets and a fair profit, some operators would be sorely tempted to try a break with the union and with pressure from miners who are working part time, some ambitious district officials might try to lead splinter groups into independence. But if the industry is in good shape when Mr. Lewis moves aside, the chances for unity among the operators and solidarity in the union are good.

Much may depend, too, on how soon the transfer of power comes. If it comes soon, older men now in top-level positions in the union and high

"Working people in a democratic society must be free to enforce their demands through economic action."



"Higher productivity means better conditions to miners, profits to coal, fair prices to consumers."

"Coal would have remained relatively backward but for constant pressure by the men who work in the industry."

Lewis' Creed—Will it guide his successor?

"Better half a million men at good wages and high standards than a million in poverty and degradation."

"The nationalization of coal mines, or any business, is wrong. Compulsory arbitration is wrong."

"We want opportunity to practice true, free and genuine collective bargaining without government interference."

in the esteem of rank-and-file miners will be close at hand and may move into Mr. Lewis' seat. In that event, the odds would be on a smooth transition. But if several years pass before Mr. Lewis steps down, those older men will be older still and might be reluctant to take over. In that event, an open struggle for power might erupt in the union's lower echelons.

At any rate, here are the possibilities. Take your pick:

1. A peaceful transition, without substantial change in union policy—Operators and association men who take this view argue that within the last year or more changes have taken place in the top leadership of other big labor organizations—the CIO, the AFL and the steelworkers' union—without upheavals in the industries having contracts with those organizations. They argue further that the UMWA is no less strong and stable and is equally competent to change its leadership without disruption. Besides, in the UMWA they see respected and able men ready to step forward from the immediate background if and when needed, plus quiet but influential policy-makers and strategists who, now effective behind the scenes, will help hold insurgents in line.

2. A peaceful transition, but with substantial change in union aims and policy—A few observers take the view that Mr. Lewis is the last of the old-style free-enterprising labor buccaneers, untouched by New and Fair Deal social and economic doctrines, and that therefore the man who succeeds him necessarily will bring a new color to UMWA philosophy. This might mean a quest for a cost-of-living clause in the contract or a guaranteed annual wage. Or it might mean opposition to machine mining and a search for featherbedding concessions, with abandonment of Mr. Lewis' historic position that it's the well-being of UMWA members that counts, not their numbers. Most observers, however, feel that Mr. Lewis has laid down his aims and policies so firmly for so many years that the odds are against a new course for the UMWA.

3. An interregnum—Some respected older hand now in the Washington office of the union may take the reins temporarily while rivals for Mr. Lewis' crown, with an eye to the end of the interregnum, consolidate their positions in the districts. This way, na-

tion-wide stoppages probably would be held at a minimum but local and district disturbances would erupt in direct proportion to the jealousies of district leaders and their jockeying for power.

Another interregnum possibility, suggested by one operator, is committee rule by three or four top leaders until some leader emerges with the qualifications for Mr. Lewis' job or the daring to grab power. For a time at least, committee rule might reconcile opposing interest until a logical successor moves into the open.

4. Direct succession by a firebrand without the intelligence and skill of Mr. Lewis and without ability to command a loyal following–Such a man might feel compelled to act more like Mr. Lewis than Mr. Lewis himself. His aim: to solidify miner opinion behind him and bring the operators to heel. The upshot: No end of trouble for operators, miners and coal's customers.

5. A power vacuum–Many observers look on this as the most likely development. They see no evidence that Mr. Lewis has given any thought to the succession. In fact, they contend, he has knocked down or read out of the union every man who has showed symptoms of independence or ambition. Thus there is no crown prince.

Freed from Mr. Lewis' rule, ambitious district leaders would announce their candidacy, seek to consolidate a following among rank-and-file miners while undermining the strength of rivals, and thus provoke such chaos as the industry never has seen. District would be pitted against district, local against local. Pledges, made to meet an immediate tactical need, would be broken whenever the need changed. In fact, the entire union might be split asunder, with regional organizations emerging. Though some operators would welcome such splits, there are many who see merits in a single, strong mineworkers' union.

6. New affiliations for the UMWA–Lacking Mr. Lewis' leadership, the UMWA might look to outside organizations to strengthen its position. Affiliation with the AFL might provide needed strength. Besides, the economic and political color of the AFL blends pretty well with that of the UMWA. But it's doubtful that the craft structure of the AFL really fits UMWA needs.

As for the CIO, though Mr. Lewis created it, its economic and political color clashes with that of the UMWA. Nor would it be easy for the UMWA to brush aside the prejudices Mr. Lewis has carefully nurtured against the CIO and the AFL. William Green, late president of the AFL, was the target of much of Mr. Lewis' scorn and his successor, George Meany, hasn't yet earned Mr. Lewis' blessing. As for Walter Reuther, CIO president, Mr. Lewis is believed to have little regard for him.

If a new affiliation should emerge, the smart money probably would be on the steelworkers' union. David McDonald, who succeeded the late Philip Murray in the USW presidency, is known to be on friendly terms with Thomas Kennedy, UMWA vice president. The two men see each other often. Thus far, the back-room talk has it, Mr. McDonald looks skeptically on the blandishments of Mr. Reuther. If a coalition should develop between the UMWA and the USW, the man who grasped its leadership would hold in his grip the Nation's two most basic industries, coal and steel – a power combination unmatched in the current industrial scene.

Why "After Lewis—What?"

Whether the future of the UMWA and of relations between coal operators and the union is destined to be greater union dominance or less, the real objective is peace in the industry. Attainment of that goal involves weighing of many factors and alternative courses of action. Some of the keys are:

1. The UMWA will not vanish when Mr. Lewis disappears from the stage. It may become more dominant, or its influence may decline. Or its character may change—perhaps slightly, perhaps radically. But no matter who succeeds Mr. Lewis, operators producing a majority of the Nation's coal must deal with the union and reckon with its power for some time to come. Even operators who run their mines without a union contract cannot altogether escape the effects of union action. Therefore it is vital to coal's future that the industry seek ways to live in peace and understanding with the union. To do otherwise would be to evade realities.

2. The American working man is not an ignoramus who follows his labor leader blindly. If the miner always has answered Mr. Lewis' beck and call, the reason is operator neglect as much as Mr. Lewis' commanding genius. Given facts, the miner will act wisely. Given reason for loyalty, he will be loyal. Respected, he will return respect.

3. Operators are not powerless, as some observers contend, to shape the course of events in their industry. It will be difficult to do so, and will require a unanimity they have not yet achieved. But it can be done—and must be done—whether Mr. Lewis steps down today, next year or 10 yr hence.

What the operators can do now and in the future is outlined in the closing pages of this article. Investment of money and effort in the program will be risky. But it will be a calculated risk. Not to make the investment will be riskier still. If the investment pays off, these will be the gains:

1. A minimum of upheaval when Mr. Lewis withdraws from the scene.

2. A good start with the new UMWA president.

3. Loyal workers who, through the years, will dampen unreasonable demands and curb excesses of power.

What Will the New Man Need?

THE MAN WHO MOVES IN after Mr. Lewis will need the support of district officials and rank-and-file miners. He also will need the respect of the operators.

Nobody, not even the operators, wants Mr. Lewis' successor to be a pushover. To be sure, the operators might like an easy mark for a change. But an easy mark wouldn't last long. Either the rank-and-file miners would vote him out or some man on horseback would thrust him aside, and the difficult job of transition would have to be done all over again.

The interests of the mineworkers

will come first with the new UMWA president. That's his job. Nobody expects anything else of him. Yet, if he's wise, he will accept the fact that the interests of the mineworkers are best served by a thriving industry. He therefore will throw up no impediment to the industry's stability and prosperity.

It's reasonable to believe that operators, mineworkers and the public can agree on at least 10 attributes the next UMWA president should have. Here they are:

1. Incorruptibility.
2. Firm leadership of union lieutenants and the rank-and-file.
3. Forthrightness.
4. Understanding of the industry's opportunities and needs.
5. Modernity; that is, acceptance of machine mining and the benefits it brings to customers in lower costs and to miners in relief from back-breaking toil.
6. Negotiating skill that produces wage agreements without strikes.
7. Administrative and organizing skill that will keep the union, its treasury and the welfare fund operating on a stable basis.
8. Willingness to select and ability to direct able lieutenants.
9. Mastery of facts and respect for them.
10. Good health and long life expectancy.

In addition to the above attributes, which nearly everybody agrees would be desirable, operators doubtless would like to see the following traits in Mr. Lewis' successor—traits that would be helpful to operators without harming the miners. They are as follows:

1. Willingness to listen to the operator's side and reason out disagreements.
2. Acceptance of the need to meet on a friendly basis to exchange information and views.
3. Understanding of the problems of management and business.
4. Realism in demands for wage and fringe benefits, tempering them to the industry's ability to absorb them and move ahead.
5. Willingness to work side by side with operators in common causes such as safety, protection of coal's markets and fair transportation costs.
6. Determination to keep the government out of industry.

For the miners' part, they doubtless would like a man with the following characteristics:

1. Personal magnetism and a flair for drama.
2. Ability to win at the bargaining table without calling strikes.
3. Ability to spot and capitalize on operators' weaknesses.
4. Understanding of miners' needs.
5. Skill in conciliating disputes within the union, so that miners will not be caught in the middle.
6. Strength to organize non-union mines.
7. Determination to maintain the UMWA as an organization miners can be proud of.

In addition to the miners, who expect a new president to keep them happy, and the operators, who would like to work in peace with the union, one other group has a big stake in future UMWA leadership. That group is the public. As Harry Moses, president, Bituminous Coal Operators' Association put it not long ago in an address, "We must accept the American public as a third party to our negotiations."

Among others who make up this public, there are fuel buyers who want to go along with coal, resisting the lure of temporarily cheaper competitive fuels. One of these men, R. E. Dennis, fuel agent of Consolidated Edison Co., New York City, recently wrote as follows: "Let us see to it that the coal industry is not so injured by loss of business to liquid and gas fuels as to make it impossible for it to absorb a large and rapid demand to supply the energy needs of our basic industries. . . . In spite of market conditions, we will fuel our systen this year 66% with coal, 18% with oil, 9% with gas, and the balance will be allocated throughout the year as operating conditions require."

Mr. Dennis is one of many who share this view. But the coal industry, including the union, must guard against making it too hard for men like Mr. Dennis. To keep them favorably disposed toward coal, Mr. Lewis' successor should help make the following things possible:

1. Reasonable coal prices.
2. Dependable supply, without threat of shortage or strike.
3. Quiet wage negotiations.
4. Respect for law and the public interest.

Who's Next in Line?

IS THERE ANY MAN now in the UMWA who fills the bill? Is there anybody who has Mr. Lewis' blessing?

Penetrating the UMWA's inner councils just isn't done. That's why nobody, unless it's Mr. Lewis himself and his closest associates, knows who the crown prince is—if there is one. Mr. Lewis has given no hint to outsiders who see him from time to time. They, in turn, report no reason to believe he has given the question much thought.

But there are men around Mr. Lewis and in the UMWA field organization who may play a role in the transfer of power. Operators should take a close look at them, since knowledge of an opposite number is a good part of successful bargaining.

That's not to say that Mr. Lewis' successor is sure to be his old self after he's crowned. Power may go to his head. His strength may not measure up to his own estimate of it. Unexpected stresses may steer him onto unexpected courses. The odds are, though, that as king he'll be much the same man he was as heir apparent.

Whoever he may be, he'll live and work in Mr. Lewis' shadow, at least for a while, and he may try to walk in the old master's footsteps. But it will take skill, tenacity and bravado, possibly beyond the measure of any man now in view, to match Mr. Lewis' strides. The fact is, nobody yet has emerged who has all of Mr. Lewis' attributes in full stature.

Here are the men whose names turn up most often when operators and association men sit down to speculate about Mr. Lewis' successor:

THOMAS KENNEDY—Mr. Kennedy, now UMWA vice persident, will be 66 yr old in November. He came up the hard way, starting as an anthracite miner in boyhood and rising to become lieutenant-governor of Pennsylvania, 1935-39. He has taken part in all anthracite and bituminous wage negotiations since 1925. During World War II, he served for a short while on the National Defense Mediation Board and for some 15 mo on the War Labor Board. He maintains his home and office at Hazleton, Pa.

Unlike Mr. Lewis who, when moved, can stage a matchless display of fireworks, Mr. Kennedy is a gentle, mild-mannered man. He has earned the respect of operators, especially in anthracite, as a reasonable and skillful negotiator and conciliator, and the respect of the mineworkers as an able defender of their rights. But, lacking Mr. Lewis' dramatic gifts, he probably could not whip the miners into line with Mr. Lewis' skill. Reports persist that Mr. Kennedy's health is frail, yet he's said to fish some rugged trout streams with the best of fishermen. Most operators agree that he'd

make a good president as long as he lasted and that if he wants the job when Mr. Lewis steps aside, he will get it, with Mr. Lewis' blessing.

JOHN OWENS – Mr. Owens, UMWA secretary-treasurer, born in Wales in 1890, grew up and worked as a miner in Ohio. He once was president of UMWA District 6. Appraisals of Mr. Owens by men who have dealt with him across the table range up and down the scale, from 'stumbling and unimaginative," "no real ability," "just a good mechanic," to "dynamic in his oratory," "shrewd and sarcastic," "Mr. Lewis' ablest lieutenant."

Without question, he has some of the attributes of Mr. Lewis–tenacity, ability to blister his opponents, graciousness when graciousness is in order, ruthlessness when ruthlessness is needed. He knows the coal industry up and down, it's said, and has a strong following among rank-and-file miners, whom he might be able to galvanize into action. The general opinion, however, is that he falls short of the over-all ability of Mr. Lewis. Most outsiders who know him doubt that he could hold the union together, create any real standing for himself in government circles or get by with boldness and defiance, as Mr. Lewis does. But if Mr. Kennedy steps aside–or even if he doesn't, some observers believe–Mr. Owens would be a likely successor to Mr. Lewis.

W. A. ("TONY") BOYLE – Mr. Boyle, assistant in the Washington executive office, is reported to be Mr. Lewis' closest confidant, the only man authorized to issue orders in Mr. Lewis' name, the nearest thing Mr. Lewis has to an executive right arm. Mr. Boyle gives most of his time to dealing with the district echelon. That may not be a good jumping-off spot for a man who aspires to be UMWA president or on whom the job might be thrust, because the "big wheel" from the home office of any organization isn't always a welcome visitor in the branch office.

But nobody questions Mr. Boyle's ability. What he lacks, it's said, is a build-up of his personality among the miners. One observer suggests that if Mr. Lewis retires, he might name Mr. Boyle to the presidency, withdraw to the background and from there guide Mr. Boyle and manage his build-up.

WELLY K. HOPKINS–Mr. Hopkins, 55 yr old and a Texas lawyer, has been UMWA general counsel since 1940. Supreme Court Justice Tom Clark, then attorney-general, brought Mr. Hopkins to Washington in 1936 as special assistant in the Department of Justice. In that capacity, Mr. Hopkins prosecuted and won a conspiracy case against a group of coal operators in eastern Kentucky. "The only reason I wasn't found guilty," says one operator in commenting on Mr. Hopkins' ability, "is that I wasn't indicted." Mr. Lewis liked Mr. Hopkins' performance so well that he brought him into the UMWA organization. Since then, Mr. Hopkins is reported to have been the guiding genius in phrasing wage agreements, a leading planner of bargaining strategy, chief promoter of litigation and close adviser to Mr. Lewis.

Chief obstacles to Mr. Hopkins' succession to the presidency doubtless would be his relatively short period of service with the union, his lawyer's learning coupled with the fact that he never worked as a miner, and his lack of opportunity to build a following in the districts. Besides, it's not known whether he would want the job. But the consensus is that Mr. Hopkins is a man to watch, if not as Mr. Lewis' heir apparent then as a man whose influence on Mr. Lewis' successor will be profound.

GEORGE J. TITLER–Mr. Titler, now president of District 29, Beckley, W. Va., was born in Pennsylvania in 1895, the son of a miner. Men who deal with the union across the bargaining table and on grievances are divided in their estimate of him. One school of thought holds that he's able, honest, tough and militant, driving a hard bargain but hewing to it once he's put his name on the line. Others argue that they can't see Mr. Titler as UMWA president–"doesn't think in a straight line," they say; "is militant, but doesn't know where he's marching to." The fact remains, he can make a rousing speech and electify a strong following. If the issue of succession comes to a convention floor fight, Mr. Titler will be a man to reckon with.

The names above – Kennedy, Owens, Boyle, Hopkins and Titler–overshadow other names that crop up when coal men speculate on the UMWA's future, though from time to time dark horses show up in the conversation–Hugh White, president of District 12, and Harrison Combs, a Kentucky lawyer, to mention only two. But mostly, according to observers, district leaders can be written off. As one man puts it, "I personally know nearly all the district presidents and there is not a real leader among them. There are two or three good district men the operators respect and can work with but they do not have leadership or coordinating ability." Another says, "As to anyone in the field taking over Mr. Lewis' place, to me it seems totally out of the question." Two others report, "There is certainly no one in this neck of the woods capable of capturing the leadership."

For the New Leader—Problems

IT'S NOT GOING TO BE EASY for Mr. Lewis' successor. He'll have a hatful of prickly problems right away.

Here are some of the big problems he will face:

1. Management and control of a complex and wealthy organization.
2. Appeasement of disappointed aspirants for Mr. Lewis' crown and conciliation of insurgents and malcontents.
3. Maintenance of discipline among the rank-and-file.
4. Consolidation of power and establishment of his leadership, including the build-up of his personality.
5. Stabilization of the welfare fund. (On this problem, one observer comments, may hinge the fate of the UMWA. The new leader must either find more revenues by organizing non-union mines or pare welfare operations to the limit of current revenues. Present contributors can't pay a higher tariff and stay in business. In fact, there now are miners who would prefer full-time work at a non-union operation to part-time work at a mine that has lost customers because of the 40c-a-ton welfare surcharge.)
6. Organization of non-union mines, especially in such competitive areas as Kentucky, West Virginia, Pennsylvania and Ohio.
7. Conducting successful wage talks across the table from experienced operator negotiators.
8. Possible efforts to "bust" the union.
9. Disunity among operators.
10. A test of strength thrust upon him by operators who, probing for weak spots in a new adversary, may press their views with new vigor.
11. The challenge to measure up to Mr. Lewis' stature and match his victories.
12. Dealing with an industry subject to recessions, and thus with elements likely to be driven to the brink of despair by costly wage increases and loss of markets, as at present.

For Operators—Hopes

OPERATORS WILL PLAY NO PART in naming Mr. Lewis' successor. As one spokesman put it not long ago, "We'll have no more to do with it than the UMWA has to do with electing a president of the National Coal Association."

Nevertheless, whoever takes up the leadership of the union and however he comes to power, coal operators can't escape being involved in the changeover and caught up in its consequences. For that reason, they must be granted their own right to hope.

Operators' hopes, briefly, shape up this way:

1. A smooth transfer of power.
2. Uninterrupted coal production.
3. Maintenance of cordial, business-like relations with the union at all levels.
4. No back-set in coal's public relations, locally or on the national scene.
5. Solidarity among the operators.
6. No government interference.

Operators' Program—For Now

IS THERE A CHANCE for operators to make good their hopes?

This article assumes that organization of at least a controlling percentage of the productive capacity of the Nation is a real influence on stabilization and that organization should be considered on that basis as long as it works to contribute some stability and progress.

If operators can't choose the new UMWA president, at least they can cushion the shock that may come with the transfer of power and thus, by helping themselves, perhaps make things easier for the union, not to mention the public.

Granted, as stated earlier, that the operator's course will depend on circumstances at the time Mr. Lewis steps down, the fact remains that whatever the circumstances may be, there's much that can be done now and in the near future. As one operator said recently, "We should have been thinking for the last decade about how to prepare for Mr. Lewis' retirement."

The time to start is now. If operators wait longer, until the crisis is upon them, their hopes may be dashed. But if they plan and act now, they may be able to knock the peak off the crisis when and if it comes. Even if they fail in efforts to avert a crisis, what they do between now and the time when a new UMWA leader takes over may set the course of relations with the union under new administration. A sound program now to win the loyalty of workers may determine whether, through the years ahead, miners will temper the demands of the new president or follow his beck and call without question.

What can operators do, singly and collectively, between now and the time when Mr. Lewis steps down?

Many of them already are making progress with constructive programs. Those who have started need the support—and participation—of others who haven't yet got under way.

Here are some suggestions for planning and action that may make the transfer of power easier on everybody:

FOR INDIVIDUAL OPERATORS . . .

1. Give workers no reason to think the company aims to "bust" the union. Any move capable of such misinterpretation by the union could destroy the confidence operators have built up among workers, at considerable cost in dollars and patience.

2. Keep the company in good repute among workers, above reproach and above suspicion of chiseling on welfare, corner-cutting on wages and hours, dodging safety regulations or tolerating bad working conditions. As a leading coal producer said not long ago, "We probably never would have had extremists in labor if it had not been for the fact that management had taken advantage of labor. The unions originally were formed for self-protection."

3. Show respect for the union and encourage miners to take part in its affairs. Maybe the union hasn't made life a bed of roses for the company. But the union belongs to the miner. It's brought him a long way, he's been through tough times to make it strong and he looks on it as his shield against injustice and exploitation. The miner will interpert disrespect for his union as disrespect for himself.

4. Make every effort to settle grievances as fast as they erupt. A backlog of grievances is bad enough in ordinary situations. In a time of crisis, which may come with a change in union leadership, a backlog of grievances could be fatal to peace.

5. Stay out of union's internal affairs and avoid taking sides in any dispute within the union. But without intruding into union affairs, a company can find occasions to remind miners of the merits of loyalty and solidarity under union leadership. If miners are persuaded, their attitude might prevent disorganization, confusion and splintering in a leadership vacuum.

6. Seek out and foster areas of common interest between the company and the union—safety, customer satisfaction, productivity, mechanical improvements, better schools, civic crusades and recreation, to name a few.

7. Encourage pride in the company by keeping workers posted on progress, performance and plans.

8. Help miners understand the American economic system, the benefits it brings to owners and workers alike and the contributions each side can offer, separately and together, to make the system work better for everybody. A prominent operator put it wisely and well in a recent comment. He said, "We need a Voice of America in our industry to show the workers the problems the operators face and to show that these problems directly affect the worker. Until the worker begins to realize that he and the operator are partners in an industry, we are bound to have labor and management working against each other."

In this effort, the Hobso Plan, or some modification of it, is worth a try by coal companies. Some 300 companies in other industries have tried it. They report it works out well. Briefly, the Hobso Plan is a system of round-table analysis and discussion of economic principles and issues, without preachment or moralizing, among small groups of executives, management men and workers. Usual procedure is to start at the top, with executives, and work down through the lower echelons, one level at a time. Sometimes, community groups are set up. For details about the Hobso Plan, write to E. F. du Pont, director, employee relations, E. I. du Pont de Nemours & Co., Wilmington, Del.

9. Keep foremen and supervisors posted on the facts about company operations, policies and issues facing the company in its relations with workers. See that management men get the facts as soon as union leaders get them.

10. If local disputes do develop, air the facts among the workers and other people in the community. But don't expect a thorough airing to persuade people that the company is always right. It may accomplish no more than to show people that the company tries to be right. Even that, though, will be progress and people soon will learn that when the com-

pany speaks out, it has something to say.

11. Reach out beyond miners with information about the company, the industry and the American economic system. Gear the approach to the interests of each group aimed at—women, school children, bankers, editors, doctors, storekeepers, teachers and all the other people who, added together, form public opinion. Helps are easy to find. For example, Bituminous Coal Institute, Southern Building, Washington 5, D. C., is a fruitful source of materials. And don't overlook company management men and salesmen as helpers. Send them out to talk to groups and encourage them to bring the company and the industry into curbstone and barbershop conversations.

12. Set aside dollar reserves to help ride out any storm that may blow.

FOR OPERATORS COLLECTIVELY

1. Strengthen and consolidate the top bargaining agencies of the industry, submerging individual and group interests in the common cause. It's hard to believe that task will be as hard as an association man recently said it would be. He wrote, "My opinion is that the operators won't do anything, either individually or collectively, but just sit back and take whatever comes out of the change-over in leadership. If you'll tell me when the operators ever stuck together, I'll buy you a new hat." On the other hand, there are some operators who know that to make the best of what may be a trying situation when Mr. Lewis steps down, they must hit on something better than they've had thus far. With the threat of disaster in default of operator action, there's reason to believe they will do better for themselves.

2. Determine policy and attitude toward the union at the highest operator levels—that is, among the boards of directors of the top bargaining agencies. But provide for free flow of information upward from district and regional associations to help determine aims in bargaining. Likewise, provide for free flow of information downward and thus insure uniform approach to and administration of the contract, once it is written, at the district and local levels.

3. Take concerted action to shore up weak spots—safety, welfare payments, working conditions, operator disunity—and thus reduce the number of targets the new UMWA president can shoot at.

4. Keep trustworthy men—that is, men whom operators and the union alike can trust to do what's best for the industry—in the offices where contracts are negotiated and administered.

5. Examine every contingency that may develop from a transfer of power in the union and stand ready, in advance, to move constructively in every contingency. That, it's said, is one of the secrets of Mr. Lewis' success. He broods over his strategy, trying to foresee every conceivable move and circumstance. For each, he plans a counter-move. That way, he can move decisively in crisis.

6. Maintain friendly, informative contacts with the union at top and district levels and, as opportunity arises, study and sound out the men who seem likely to play a strong role in the transfer of power.

7. Avoid trying to nominate Mr. Lewis' successor. Voice no support for any candidate and don't try to block any candidate.

8. Ask the union to keep operators informed of coming events. Operators may not get much information that way but if the inquiries are kept tactful and constructive, they can do no harm and might, indeed, bear some fruit.

Operators' Program—For Crisis

WHAT WILL HAPPEN when Mr. Lewis moves out will depend, as stated earlier, on circumstances at the time. Prosperity or recession in the industry will influence the course of events. Likewise, the timing of Mr. Lewis' departure will have some bearing on the emergence of a successor and on the operators' readiness to cope with the situation.

Even so, operators can do some things to keep disruption at a minimum. They can do these things whatever happens, whenever it happens and whoever moves into Mr. Lewis' seat:

1. Accept Mr. Lewis' departure from the scene with equanimity. If, at times, he's been the top salesman for oil and gas and a sore trial to operators, he's been a hero to the miners and a good salesman for mining machinery. His withdrawal will bring no certain benefits to the operators. It may, in fact, bring profounder troubles to the industry.

2. Stay out of any struggle for power that may follow Mr. Lewis' exit. It will be the miners' horserace. Let the miners run it. For operators to back the wrong horse would be to court disaster.

3. Assuming that the benefits of stability outweigh the headaches of dealing with the organization, resist the temptation to break the union. An experienced negotiator reports that he knows of no responsible operator who wants to break the union and no irresponsible operator who has the strength or the money to carry the effort through to success.

4. Accept the new UMWA president with equanimity. Give him a chance to take control and set his course. If he has a firebrand's history, responsibility may sober him. If he's weak, he may grow to the measure of his job. If power goes to his head, his lieutenants may restrain him. At any rate, hope for the best. He may turn out better than many people expect.

5. Approach the new president with friendly gestures. At the same time, be prepared to accept a rebuff, recognizing it for what it may well be—an act calculated to establish a reputation as a tough adversary of the operators and thus win miners' loyalty.

6. Avoid any suspicion of trying to make capital of the transition period. The temptation to press issues to a decision may be great. But such pressure would only compound the confusion, if confusion comes. Besides, decisions made under stress probably wouldn't stick.

7. Make no sub rosa agreements with district officials or leaders of splinter groups. Such agreements can boomerang—and often do.

8. Advise company employees, tactfully and unobtrusively, to sit steady in the boat while the new president settles down to his command.

9. Sustain and strengthen company efforts to win and hold the loyalty and friendship of workers.

Because the UMWA has been Lewis for so many years and, by the same token, Lewis has been the union, the problem of the transfer of power and leadership can be truly said to be unique. Disappearance of the outward and actual symbol of power which is Mr. Lewis is bound to leave a vacuum—and in a vacuum the chances of confusion, disruption and trouble are very real. The more the confusion, disruption and trouble, the greater the damage the coal industry and the individual operators are likely to suffer. That is one real reason for putting "After Lewis—What?" high up on the list of things entitled to active consideration from now on. The second is the creation of a climate in which operators and miners can work more closely together in bringing about greater prosperity and a better living for all men in the industry.

EFFICIENT STRIPPING OF 20-IN SEAM at the new Power mine requires equipment like this 17-cu yd shovel.

High-Capacity Stripping . . . 3,000 TPD From 20-In Seam

For successful thin-seam stripping at new Missouri mine, Power Coal teams big shovels, large haulage units and quality through tailored preparation.

By A. E. FLOWERS, Assistant Editor, Coal Age

EFFICIENT STRIPPING of a 20-in bed of coal, preparation of a product tailored to customers' needs, and close proximity to markets add up to a favorable position for the new Power mine of the Power Coal Co., Montrose, Mo. Developed in the fall of 1952 to serve the utilities and industrial plants in the Kansas City area, the new strip operation in Henry County, Missouri, is the result of concerted efforts by Power's owners to develop modern mines near coal markets.

Located 60 mi southeast of Kansas City, Mo., 15 mi west of Clinton, and served by the Missouri, Kansas & Texas R.R., Power mine produces 3,000 tpd from the 20-in Tebo seam. Washing and drying facilities in the new preparation plant are designed to clean, dry and size 400 tons of raw coal per hour. Plant construction began April 25, 1952, when work started on the preparation plant and the 6-mi railroad extension from La Due, Mo. Mining equipment was moved in and assembled in the fall and stripping started Nov. 9, 1952. Coal loading began 4 days later, on Nov. 13.

STRIPPING CONDITIONS

Overburden consisting of soil, hardpan, shale, limestone, clay and carboniferous shale ranges from 10 to 70 ft in thickness. Soil overlying the hardpan is very thin, in most instances being less than 6 in. A hard irregular carboniferous limestone, from pencil line to 3 ft in thickness, lies immediately over the coal. At times this material disappears and the immediately overlying 3-ft black shale is on top of the coal. Gray shale, 1 to 4 ft thick, covers the black shale and is immediately under the hardpan and clay. The coal seam itself is relatively flat and ranges in thickness from 18 to 24 in.

DRILLING AND SHOOTING

Horizontal 5-in drill holes, spaced 20 to 30 ft apart, are drilled 65 ft deep by a rubber-tired unit designed and built by the Power Coal Co. The drill is operated by a two-man crew who average 720 ft of drilling per 7¼-hr shift. In arriving at the final design of the drill, two conditions had to be satisfied:

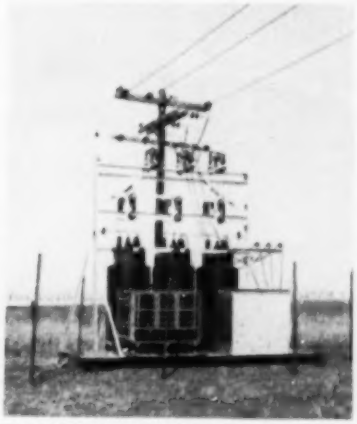
1. The drill had to be easily moved

BULLDOZER AIDS LOADING by pushing loose coal in pile after helping road grader clean the top of the coal.

COMPANY-DESIGNED DRILL can be set for drilling in 20 to 30 sec. Hydraulic jacks provide vertical adjustment.

PINNING MACHINE BREAKS COAL with a 5-in hardened-steel tapered pin mounted in a 4,000-lb iron casting.

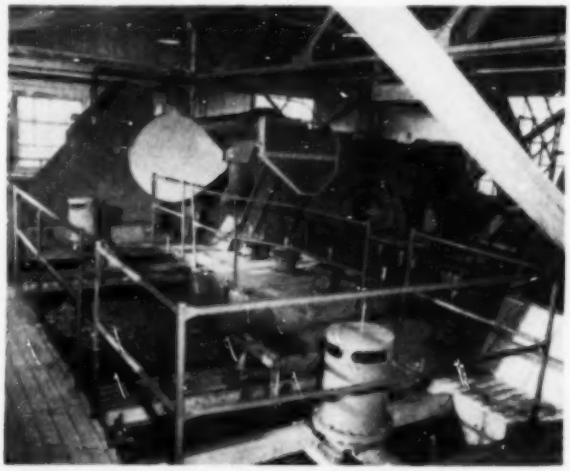
DROPBOTTOM HAULAGE UNITS, loaded by a 3¼-cu yd electric shovel, haul 30-ton loads ⅝ mi to the tipple.



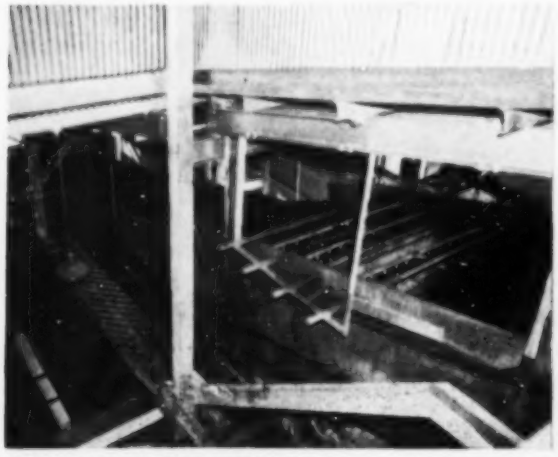
PORTABLE TRANSFORMER station reduces voltage for transmission to pit.

MODERN PREPARATION PLANT tailors coal to customers' needs. Breaker house at right receives raw coal from 250-ton bin. Rotary breaker reduces R-O-M to 4x0. Jig washing, crushing and drying are features of the washer section.

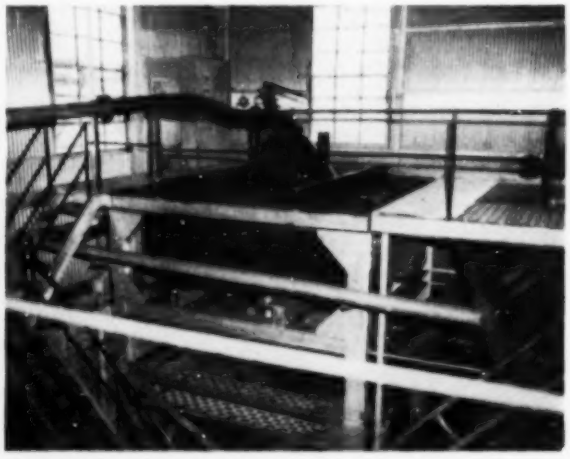
ELEVATING BELT CONVEYOR, 36-in wide, carries 6x0 raw coal from the primary breaker to the 5-cell washer.



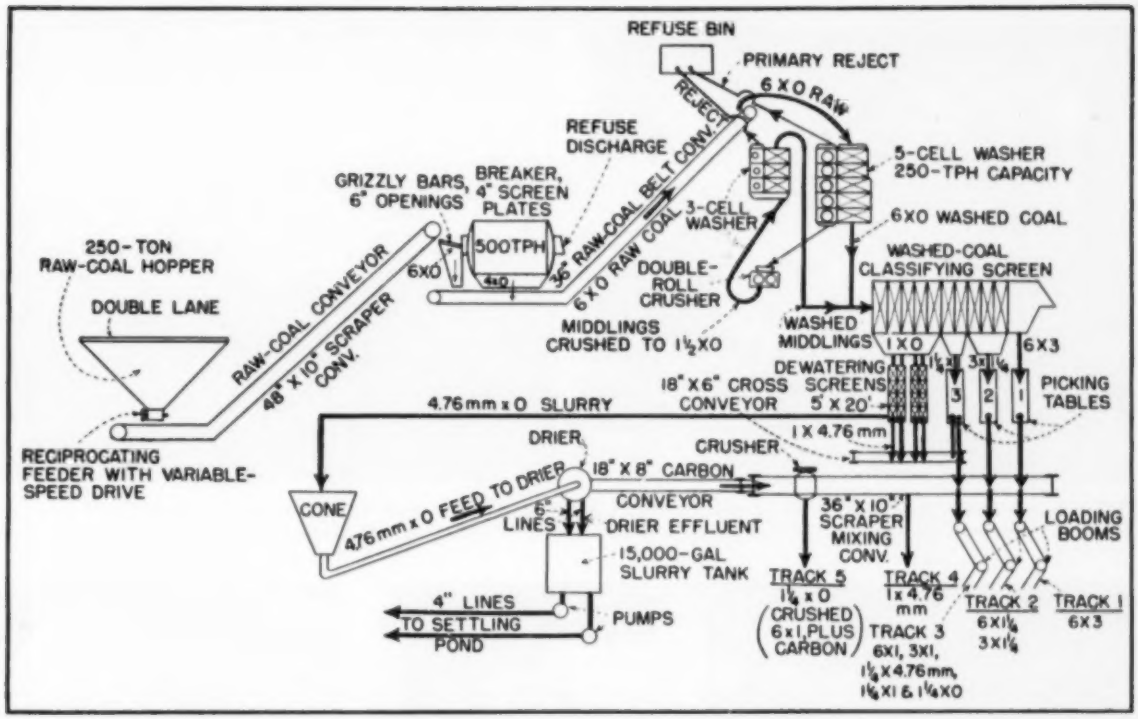
SEPARATION OF COAL AND ROCK is handled by jig washers. Primary separation is handled by a 5-cell unit.



MAIN CLASSIFYING SCREEN separates the washed product into 1x0, 1¼x1, 3x1¼ and 6x3 products.



CENTRIFUGAL DRIER receives 4.76mmx0 slurry from settling cone and delivers dried product to the conveyor.



COAL FLOW in the new Power plant permits maximum recovery of clean coal and provides a uniform product to the customer. Flexibility permits loading five different sizes simultaneously. Large sizes may be crushed to stoker or slack.

from hole to hole and be ready for drilling without setting up.

2. The vertical positioning of the auger had to be accomplished easily and rapidly.

Roy Hauck, master mechanic, and Fred Horne, explosive engineer cooperated in the design and supervised construction of the drill.

An old truck was the source of wheels, differential and steering mechanism. Hydraulic cylinders were made in the shop, along with various other machine parts. The chassis was made of ¾-in welded steel plate. Outstanding feature of the drill is quick vertical adjustment—in 20 to 30 sec—of the position of the auger between any point from 6-in above the pit floor to 6½ ft above.

An electric crane powered by a ¼-hp Westinghouse motor handles 8-ft auger sections between the built-in auger rack and the auger drive. Auger sections are spline-connected. Sections weighing 125 lb each are made of 2- and 3-in-diameter tubing, ½ in thick. To these are welded spiral steel to complete the auger. Twelve sections are stored on the rack in a position parallel to the direction of drilling, permitting speedy handling when auger sections are removed or placed on the rack.

Drill feed is hydraulic at 1,000 psi. The entire hydraulic system is operated by a hydraulic pump powered by a 15-hp Westinghouse motor. The rotary action is driven by a 30-hp Westinghouse motor. All motors are 440-v AC receiving power through a 600-v cable leading to power transformers located on the highwall above the drill. Total weight of the drill with augers is 23,000 lb.

Augers are equipped with Drillmaster No. 69 throwaway-type drill bits arranged in two groups of four on the auger head. Approximately 130 ft of 5-in-diameter hole is drilled before bits are replaced.

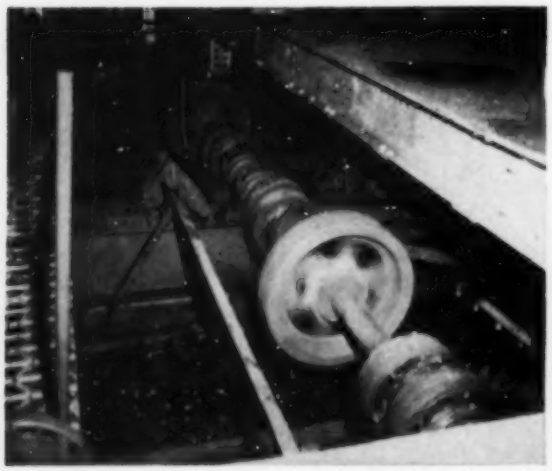
Drill holes are very wet and are loaded and shot as quickly as possible. Two men charge each hole with approximately 150 lb of 3 x 24-in Hercomite 6A powder. DuPont Primacord and M-S delays are used to connect and detonate 25 holes per shot. Duties of drill and shooting crews are flexible and in some instances are overlapping, depending upon which operation needs more manpower.

MINING AND HAULING

A Marion 5480 17-cu-yd electric shovel uncovers coal three shifts per day, 7 days per week. Other operations, such as, drilling, shooting, hauling and preparation, are on a single-shift basis. Pit width varies from 50 to 100 ft and averages 75 ft. A Caterpillar D8 Bulldozer and Caterpillar No. 12 road grader team up to remove remaining rock from the coal before loading begins.

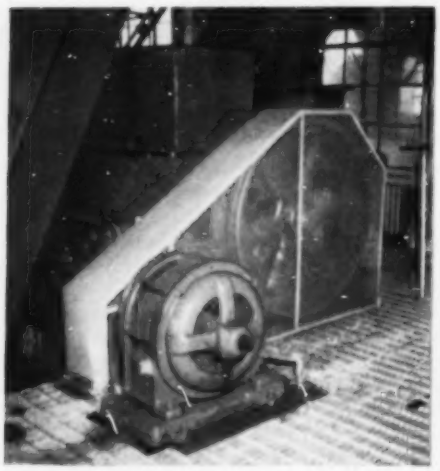
A pinning machine moves in on top of the clean coal and pins it every 30 in. This machine acts like a mechanical pick and moves back and forth to loosen the coal. An 8-in tapered-end 5-in-diameter hardened-steel pin is the breaking medium. It is inserted in a 4,000-lb casting which is raised by a chain arrangement powered from the tractor engine and released to pierce the coal. Force of the pin-weight combination falling a distance of 96 in is sufficient to break the thin coal. The pinning mechanism is mounted on a Caterpillar D-5 tractor frame and is powered from the engine through gears and a chain-sprocket arrangement.

A Marion 480 3¼-yd electric shovel loads into three Caterpillar DW20 30-ton diesel-powered dropbottom tractor-wagons hauling coal to the tipple storage bin. These Caterpillar units are the first of their type to be used in the coal-stripping industry. Originally designed to haul 17 cu yd, the wagons were altered by the manufacturer to meet Power Coal's conditions and sideboards were added by the company to increase the capacity. Present haulage distance is about 1 mi per round trip between the pit and the 250-ton bin.



TWO DEWATERING SCREENS RECEIVE 1x0 from the classifying screen and make 1x4.76 mm and 4.76 mmx0.

NEATNESS AND GOOD HOUSEKEEPING are reflected in aluminum shop and surrounding seeded areas.



CRUSHER breaks primary reject for delivery to secondary washer unit.

TURBINE PUMP (left photo) distributes water from 1,045-ft well to plant. Quality control (right photo) is centered in company laboratory at plant.

CLEANING THE COAL

A double-lane 250-ton bin receives coal from the 30-ton trucks after it passes through a grizzly at the top of the bin. The grizzly prevents large lumps from getting in the bin and fouling the variable-speed Reeves-drive reciprocating feeder located at the bottom of the bin. A 10 x 48-in scraper conveyor receives coal from the feeder and elevates it to the breaker house. Here, a bar grizzly, with 6-in openings, scalps out the 6 x 0 raw coal and delivers the oversize to a 500-tph Bradford breaker. Refuse passes to the refuse bin and the 4x0 breaker product and 6x0 from the grizzly flow to a 36-in raw-coal belt that discharges into a McNally-Norton 5-cell 250-tph washer at the top of the plant.

Clean 6 x 0 flows to the main classifying screen and is sized into 1 x 0 1¼ x 1, 3 x 1¼ and 6 x 3 fractions. The three larger sizes pass over picking tables before delivery to a 10 x 36-in mixing conveyor distributing clean coal to railroad cars. These sizes also may be delivered to an American Pulverizer Co. ring crusher, located beneath the mixing conveyor, for crushing to 1¼ x 0 and loading on Track 5.

The 1 x 0 product from the classifying screens flows to two McNally-Pittsburg 5 x 20 ft single-deck dewatering screens where it is dewatered and sized into 1 x 4.76 mm and 4.76 mm x 0 fractions. The larger product may be loaded directly on Track 4 or be diverted by a 6 x 18-in cross conveyor to Track 3 where it joins the 1¼ x 1 and is loaded as 1¼ x 4.76 mm. Underproduct from the dewatering screens flows to a settling cone where solids are concentrated and flow by gravity to a CMI coal drier. Dried carbon passes to an 8 x 18-in scraper conveyor discharging to the mixing conveyor and is loaded with the slack coal.

Reject from the 5-cell washer passes to a McNally-Pittsburg double-roll crusher feeding 1½ x 0 to a McNally-Norton 3-cell washer. Washed middlings join the clean coal from the primary washing and pass to the clean-coal classifying screen. Refuse from the secondary washer is discharged to the refuse bin.

WATER SUPPLY

A 10-in-diameter 1,045-ft-deep well, tapping water in the Gunter

SLURRY POND (left photo) receives mixture of solids and water from 15,000-gal slurry tank. Clear water from center of pond is pumped to fresh-water lake (right photo). Pump in white building delivers fresh water to the washer.

sandstone, provides abundant fresh water to the Power preparation plant. Water rises in the well to a level approximately 60 ft below the surface and is distributed to various discharge points by a 16-stage Peerless turbine pump whose bowls are set 220 ft below the surface. Water may be pumped directly to the plant, to a Webb water softener that supplies drinking water, boiler water and radiator water for trucks, or to a 2,000,000-gal fresh-water lake. This lake is the primary source of water for the plant and receives its supply from surface runoff, from clarified water pumped out of the slurry pond or from the deep well if necessary. A Deming 4 x 6 1,000-gpm pump powered by a 50-hp motor delivers water from the lake to the preparation plant where it is used on classifying-screen coal sprays and mixed with 4.76 mm x 0 feed to the drier.

A dual interconnected 4-in pipe line and pump system leads from the 15,000-gal slurry tank in the tipple to the slurry settling pond. Only one pipe line and one pump are necessary to handle the slurry, the other remaining in readiness in case pump or pipe-line repairs are needed. A Deming 4 x 6 1,000-gpm pump picks up clear water in the settling pond and delivers it via a 4-in pipe line to the fresh-water lake.

All pipe lines in the water system are laid on a uniform grade to permit positive draining in freezing weather. At the end of each work shift all slurry lines are flushed by opening valves which permit fresh water from the lake supply to flow through the system. In addition, all fresh water and slurry lines outside of the plant are connected with threadless couplings, Gustin-Bacon Rolaflex type, to permit easy and rapid replacing of worn-out sections.

ROAD BUILDING

Looking to the future when haulage distance will be greater, Power Coal is building solid well-drained roads. Roads leading to the pit are graded, ditched and covered with 4-in limestone. After this material is compacted by truck traffic, it is covered with 2-in limestone and again compacted by traffic. A road grader keeps the road smooth and additional limestone is added as needed.

Inclines into the pit are built by a shovel-bulldozer combination which uses pit rock to form a base. Over this is placed a 2-ft layer of fireclay from under the coal seam and after compacting it is topped with 2½ in of crushed limestone. One such incline is built at each end of the strip pit.

NEATNESS STRESSED

Recognizing the benefits of a neat, bright plant, Power Coal management designed and built the surface plant so it would have a bright appearance and be easy to keep clean. Open-type steel flooring is used throughout the plant to prevent dust and water from gathering. Much of this floor is made from reclaimed steel airstrip landing mats. Air, steam and water outlets are placed throughout the plant on all floors and are used daily in cleanup work. Large window areas are included throughout the plant and are cleaned regularly.

Adding to the neatness and light appearance is the systematic application of bright paint to various plant equipment. For example, equipment guards and danger zones are painted yellow, hand rails are red, machinery is green and supporting structure is aluminum. Completing the neat picture at Power mine is aluminum sheeting on the plant exterior, and graded and seeded areas around the plant.

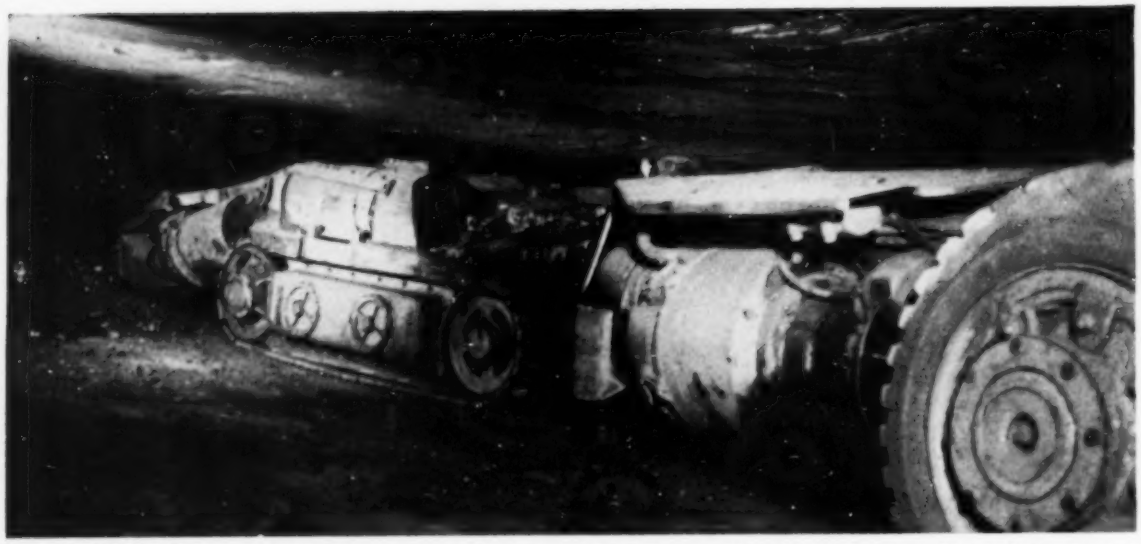
Heading Power mine's management group is W. V. Hartman, superintendent. Aiding him in discharging his duties are: Oscar Shelton, pit foreman; John Richie, tipple foreman; and Howard Reddick, time keeper.

POWER SYSTEM

Power is purchased from Missouri Public Service at 13,200 v and stepped down to 4,160 v near the pit by three 333-kva General Electric skid-mounted transformers. Power from the transformers is delivered to switchhouses near equipment by a 4-wire 2/0 copper pole line. When the distance from the transformer station to the equipment approaches an economic limit, the substation is disconnected and towed to a new location close to the electrical load. The previous 4,160-v line becomes a 13,200-v line merely by connecting it to the 13,200-v line with jumpers. It then delivers the higher voltage to the transformers at the new location.

RECLAMATION PLANNED

Included in future plans is a program of reclamation, to be started as soon as sufficient territory has been stripped. Reclamation of Missouri strip areas is coordinated by the Missouri Coal Operators' Association, of which Power Coal is a member. The entire reclamation program will be geared to produce the greatest return possible to the community and the company.



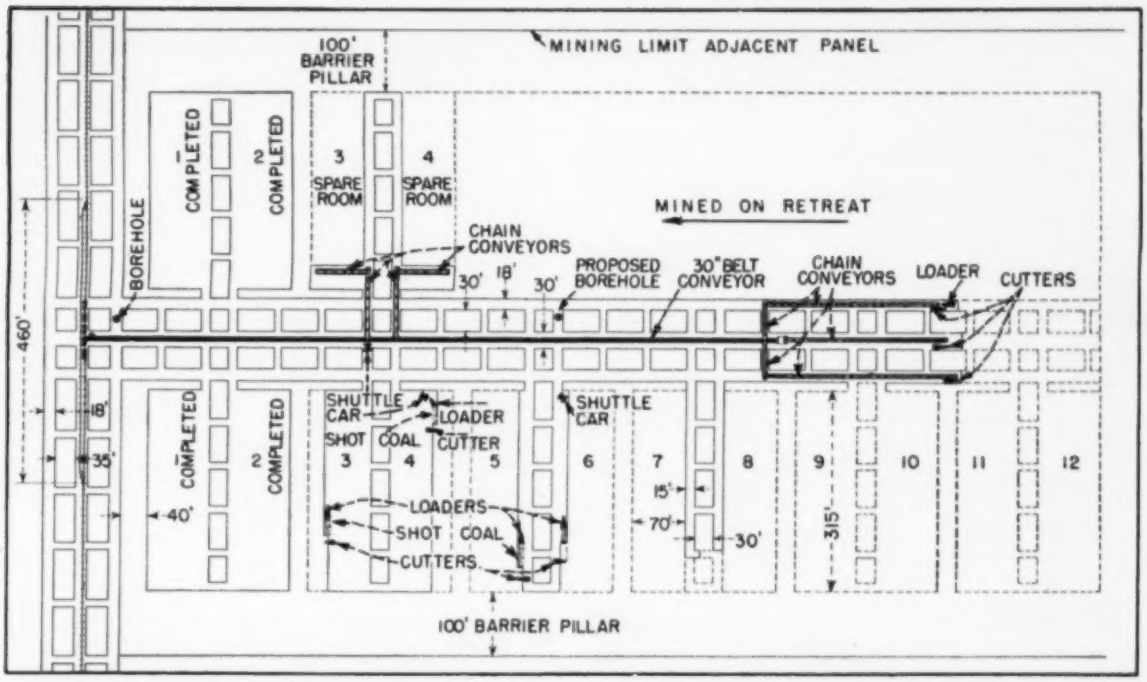
EXCELLENT ROOF, clean coal and uniform conditions permit Ben Hur to achieve high efficiency with mobile equipment.

SHUTTLE CARS HAUL COAL from long faces to 30-in belt setup in panel entries. Face length is 315 ft.

PANEL BELT CONVEYOR teams up with offtrack face equipment for smooth efficient operation at Ben Hur.

PREPARATION FOR BLASTING is continuous ahead of the loader. Men are withdrawn before holes are fired.

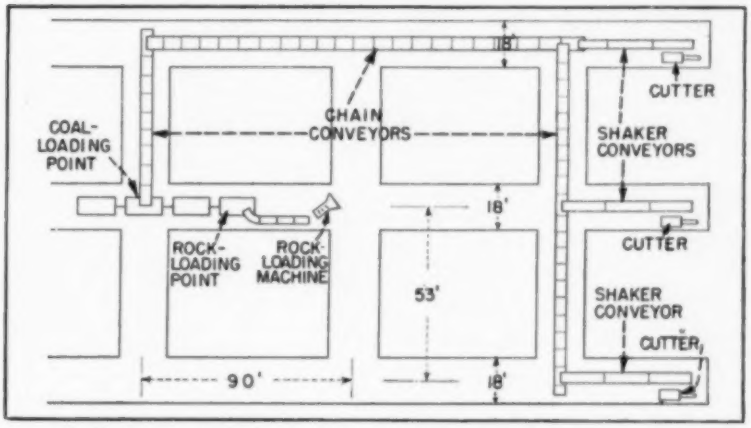
DROPBOTTOM MINE CARS on main haulage receive coal from belt. Top is brushed to give 7 ft of clearance.



MINING EQUIPMENT IS CONCENTRATED on 315-ft faces at Ben Hur. Loading, drilling and cutting are continuous after the faces are developed. Conveyor units develop the headings and serve as spare equipment in two spare rooms.

High Efficiency in 36-In Coal With . . . Machine Loading on Long Faces

- **Ben Hur concentrates equipment on one 315-ft face**
- **Carries on cutting, drilling, loading continuously**
- **Uses belt haulage in panels to save top brushing**



MAIN-ENTRY DEVELOPMENT is by shaker and chain conveyors set up in three headings. A loader-shaker combination loads rock in the haulage entry.

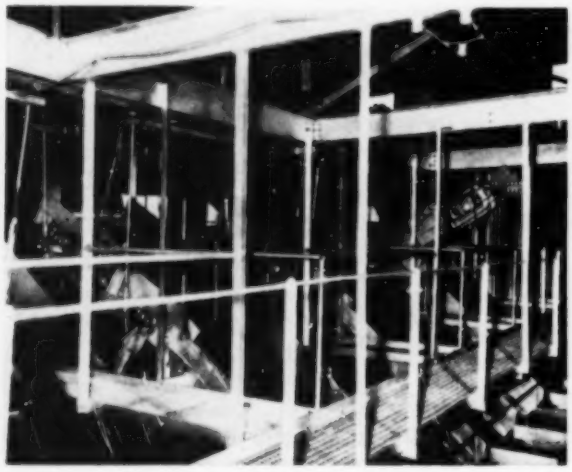
APPLICATION OF MOBILE EQUIPMENT to long-face mining marks another step in the campaign to raise mining efficiency at the Blackstone mine of the Ben Hur Coal Co., Henryetta, Okla. Taking full advantage of the excellent natural conditions, Ben Hur has developed a system of mining which permits concentration of men and section equipment on 315-ft-long faces. Face operations are interrupted only long enough to blast coal for the loading machine. Conventional mining methods with three or more working places per loading unit are used only in developing the main entries and the long-face panels.

MINING CONDITIONS

Exceptionally good roof over the 36-in Henryetta seam and a firm fireclay bottom underlain by sandstone permit development of large areas with no squeezes or roof-control problems. Cover over the coal varies from 100 to 340 ft. The coal seam itself is free of impurities and is comparatively

STORAGE BIN AT TIPPLE holds 135 tons. Locomotives deliver coal in 10-car trips.

ELEVATING BELT CONVEYOR receives R-O-M coal from feeder under the bin and delivers it to the sizing screens.



BATTERY OF FOUR VIBRATORS receives 1¼x0 from the coarse-coal shaker and separates it into 1¼x¼ and ¼x0.

SIZING OF COARSE COAL takes place on a 4x60-ft single-deck shaker screen. Plus 6-in is delivered to crusher.

soft so that cutting, drilling and shooting are accomplished with relative ease. Another favorable condition is a uniform dip of 2½% to the northwest. The mine is relatively free from methane. Workable areas in the Henryetta seam are scattered, with the principal area being the Henryetta District, in Okmulgee County, Oklahoma, where Ben Hur's Blackstone mine is located. A typical analysis of the coal is as follows:

Moisture	4.82%
Volatile matter	37.81
Fixed carbon	53.03
Ash	4.34
Sulphur	1.59
Btu	13,696
Fusion temp., ash	2,420
Free swelling index	4

MINING SYSTEM

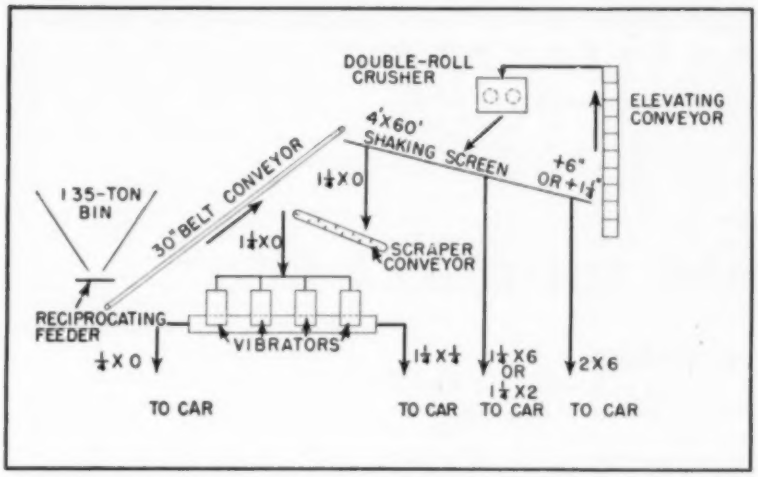
Blackstone mine was developed by a three-heading system leading from the drift opening to panel entries. Hand loading into mine cars was practiced until conveyors were developed for underground use. Ben Hur management quickly saw the advantages of this type of equipment and changed from hand loading to chain and shaker conveyors. Later, low-type mobile loaders and shuttle cars were developed for the coal industry and again Ben Hur was quick to see that mining efficiency at Blackstone could be improved by the application of such equipment. As a result, a mining system was developed to take full advantage of the good natural conditions and to reap the greatest benefits possible from the offtrack mining equipment.

Now, main entries are developed with conveyors and loaders assigned to three headings to mine coal and take sufficient top in the middle entry to provide 7 ft of clearance for main haulage. Three-heading belt panel entries, on 900-ft centers, are driven 1,200 ft deep with loading machines and conveyors. Panel headings are driven on 54-ft centers and main headings on 53-ft centers. Twelve long faces are developed from each side of the panel entry and are mined with mobile loaders and shuttle cars.

MAIN-ENTRY DEVELOPMENT

Mining equipment in main entries is made up of a Joy 12-BU loader, four

PREPARATION FACILITIES AT BEN HUR are geared to produce four different sizes of coal. Identification tags and oil treating are featured.



PREPARATION PLANT specializes in making 1¼x¼ stoker coal. At the same time, ¼x0, 1¼x2 and 2x6 sizes may be loaded on three additional tracks.

Goodman G12½ shaker conveyors, three Jeffrey 61AM chain conveyors, three Sullivan CE7 cutting machines and three Jeffrey A7 hand-held electric drills. Sufficient top is taken in the middle heading to provide a clearance of 7 ft over-all. Top brushing is done simultaneously with coal loading. The loader and a shaker team up to load and transport rock to mine cars immediately inby the coal loading point in the haulage heading. Should the rock cars be filled before the coal cars, the rock crew begins drilling another round of blastholes. If rock loading is slow or delayed, the empty cars are loaded with coal. All three headings are driven 18 ft wide on 53-ft centers and breakthroughs are 15 ft wide on 90 ft centers.

PANEL DEVELOPMENT

Three-heading panels are developed by a loader-chain conveyor combination working two headings and a hand loading-chain conveyor setup in the third heading. All units discharge to a Jeffrey 52B 30-in belt conveyor equipped with 5-ply 42-oz ⅛x1⅛ conveyor belting. A Joy 12-BU loader handles the loading job in the two entries and all working places are equipped with a Jeffrey 61AM chain conveyor, Sullivan CE7 cutting machine and a Jeffrey A7 hand-held electric drill. Cutting machines are equipped with 6-ft Sullivan chains and Firthite bits. Coal drills utilize Hardsocg augers, Firthite and Hardsocg drill bits. Loaders, cutters and conveyors are powered by 220-v AC and other equipment is operated on 250-v DC.

The two outside headings are driven 18 ft wide and the middle belt heading is driven 30 ft wide. Driving these on 54-ft centers leaves a 30-ft pillar between headings. Breakthroughs are on 65-ft centers except where long faces are developed on 45-ft centers at right angles to the belt.

After the panel is driven 300 ft, the loading machine and three men are assigned to brushing 18 in of roof in the belt heading. Top is taken in a 10-ft strip in the center on the heading and is gobbed along the ribs by the loader. The remaining men in the face crew are assigned to moving and setting up equipment at the new loading point and extending the belt line. Panel-entry development proceeds in this manner until the faces have been driven the projected limit.

LONG-FACE DEVELOPMENT

While the panel belt is being installed, equipment is also moved in to begin development of the long faces. One Joy 12-BU loader, a 6-SC shuttle car, a Sullivan CE7 cutter and a Jeffrey A7 drill are assigned to each long face. Here's how long-face mining proceeds:

Step 1—Two pairs of rooms, 15 ft wide on 45-ft centers, are driven 340 ft deep on each side of the entry. The first room is turned 125 ft inby the mouth of the panel. Breakthroughs between rooms are cut 15 ft wide on 70 ft centers. The reason for developing the first long faces on opposite sides of the entry is to permit the roof to fall after the long face is completed and relieve any pressure from subsequent long faces.

Step 2—After the pairs of rooms are driven to their limit and breakthroughs cut at the faces, the shuttle cars pull the cutting machines away from the faces to a point 25 ft inby the mouth of the rooms. At this point, machines in the inby rooms sump in the inby ribs and begin cutting toward the face. Cutting in outby rooms begins at the same point in the outby ribs and proceeds in a like manner.

Step 3—After cutting has progressed sufficiently, the face is drilled and prepared for shooting, holes are charged with 1½ sticks of 1½x8-in Hercules Bituminite powder, men are withdrawn from the area and the coal is shot. Cutting and drilling continue ahead of the shot coal and the loader and shuttle car move in and start loading at the beginning of the cut. Shuttle cars discharge coal directly onto the 30-in belt conveyor discharging into 4-ton 3-door Sanford-Day dropbottom mine cars. This cycle con-

times until the cutter reaches the face of the development room.

Step 4—When the initial long-face cut has reached the face of the room, the shuttle car pulls the machine back to the point where the first cut was started. Cutting, drilling, shooting, loading and hauling continue uninterrupted except when coal is shot. After the long faces have been advanced 70 ft, they are considered completed. Then the equipment is moved to the entry and new development rooms are started on the right side of the entry. Approximately 30 to 40 shifts are required to develop and mine out a long-face area. The right side of the panel is mined on the advance and the left on retreat.

CONVEYORS AID DEVELOPMENT

When the panel entry has been developed to its limit, the conveyor equipment supplements the loaders and shuttle cars and develops new rooms for future long faces. After all the rooms on the right side of the entry have been developed, the conveyor equipment is set up on the left side adjacent to the two mined-out long faces. Two rooms, 75 ft wide, are necked and face conveyors are installed with the room conveyors to provide extra working places in event of a major breakdown of equipment in long-face areas. Men are transferred from the mobile sections to hand load in these rooms when the face supervisor sees that the crew will be idle for considerable time while repairs are made.

HAULAGE

Haulage entries are double-tracked for a distance of 460 ft at all belt-loading points to permit continuous loading while cars are being placed. Mainline track is laid with 70-lb rail and treated ties and the passing track is laid with 30-lb rail. Loaded cars are hauled to the preparation plant in 10-car trips by 13- and 15-ton General Electric and Goodman locomotives.

POWER

Power is carried to the underground workings through boreholes. Overload protection is provided by fuses on the high-voltage side at each of the substations. Power is purchased at 2,300 v and is reduced to 220-v AC for the AC equipment underground. DC current at 250 v for haulage locomotives, and also shuttle cars and drills, is provided by four m-g sets.

Boreholes are drilled 900 ft apart and intersect the panel entries in the left headings. Disconnect switches at the bottoms of the boreholes permit

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Cost-Cutting Today

***Coal Age's* 14-p Special Report in last January's issue was but the opening gun in a series of how-to-do-it studies planned to pinpoint practical opportunities for lower cost mine operation under today's conditions.**

Beginning next month with a "guidebook" for the effective application of new and improved machinery and materials to everyday mine operations, *Coal Age* will publish a regular series of Special Reports on selected phases of mining—such as face work, haulage, continuous mining, power, stripping, etc.

Each report will summarize current practices at many of the country's most efficient mines and reflect the thinking of top operating men in the industry, coupled with details on the latest methods and equipment available for your use.

If you're seeking ideas to help slice your cost per ton, watch for *Coal Age's* Cost-Cutting Today series.

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easy closing or opening of the circuits. Joy junction boxes are located in all working sections. Underground power is transmitted by Hazacord rubber-covered cables hung on insulators. This type of setup provides good voltage at the faces and eliminates the handling of substations underground, which would be quite burdensome in thin-seam mining.

MAINTENANCE

Accurate maintenance and lubrication records are kept for all equipment and permit management to check on the types of failures occurring and the cost of maintaining each piece of machinery. If an excessive number of parts are being used on one particular machine, an investigation is made to determine the cause. If it is normal wear and tear, the machine is brought to the shop for overhaul. But if high maintenance is resulting from improper use of machinery, corrective measures are taken.

Portable compressed-air tanks, containing air at 125 psi, are placed on each shuttle car section to provide emergency air for low tires. Spare tires also are kept on each section to permit speedy change in event of a blowout.

VENTILATION

Air for the Blackstone mine is supplied by a 5-ft Jeffrey Aerodyne fan delivering 50,000 cfm at a 4.75-in water gage. A 100-hp General Electric 220-v induction motor drives the unit. Little gas is liberated in the mine and the strong roof does not fall and block the air passages.

Treating of mine ties is being done at the mine on an experimental basis. A steel tank containing kerosene-diluted Creosotine, manufactured by the Gordon Chemical Co., is filled with 30 ties. After 48 hr in the solution, they are removed and stocked for future use. One man devotes an average of 45 min per day to these duties. Penetration of ¼ in is achieved and management is well satisfied with the results to date.

PREPARATION

The naturally clean Henryetta coal is delivered in 10-car trips to a 135-ton raw-coal bin at the tipple. From there, a reciprocating feeder delivers R-O-M coal to a 30-in belt conveyor discharging to a 4x60-ft single-deck shaking screen separating the unsized material into plus 6-in, 1¼x6 and 1¼x0, or 2x6, 1¼x2 and 1¼x0 products, depending upon the customers' needs. All plus 1¼-in or plus 6-in may be diverted to a Jeffrey 61EW elevating conveyor discharging to an adjustable McNally Pittsburg Gearmatic double-roll crusher. Underflow from the crusher is recirculated to the sizing screen.

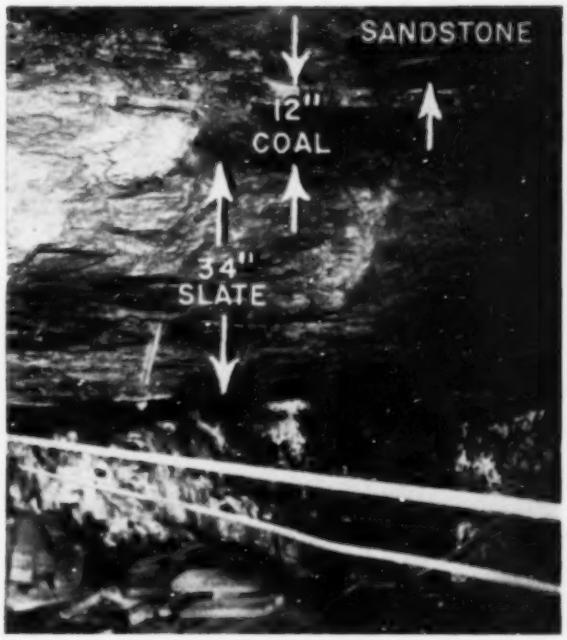
The 1¼x0 fraction from the sizing screen is carried by scraper conveyor to a group of four Jeffrey-Traylor vibrating screens separating the feed into 1¼x¼ and ¼x0 products. A mixing conveyor receives these fractions and delivers them to loading points over the railroad cars.

All sizes may be oil treated according to the customer's needs. A complete Brown-Fayro system delivers Phillips oil to loading points and sprays the coal while it is in suspension.

To assure customers that they are receiving Blackstone stoker coal from the Henryetta seam, Ben Hur distributes 230 identification tags, 1¼-in in diameter, in each railroad car. Blackstone mine has been producing coal for 35 yr and has been under the present management since 1936. Ben Hur specializes in making a high-quality stoker coal which finds ready markets in Oklahoma, Nebraska, Kansas, Missouri, Iowa, Minnesota and South Dakota.

Members of the Ben Hur management team include: Earl Goldsmith, auditor; J. A. Roberts, superintendent; Jesse Roberts, chief electrician; and L. W. Cady, top foreman and engineer. Ed Looney is first-shift mine foreman, with James Leonard and F. S. Butler in charge of the second and third shifts underground.

BOLTS DO THE JOB ROOF BOLTS provide the necessary protection in the No. 5 mine of the Red Parrot Coal Co., Prenter, W. Va. In this photo, taken between shifts, the rubber-tired cutting machine with coal drill on top stands at the face ready for business and, with bolts in, posts have already been removed for sumping.



BAD TOP TYPICAL OF THE ROOF up to the strong massive sandstone is this place shot down for installation of an elevator. Bolts were applied successfully after 6x8-in by 14-ft sawed headers failed and resulting falls in airways and haulageways slowed tonnage production. Roof bolts here are 5 ft for at least 8-in anchorage in sandstone.

Bolts Conquer Mean Top

When a bad top began to crush wood posts and jeopardize profitable mining, Red Parrot found its answer in roof-bolting. Successful application, backed by time studies, followed revision in bolting methods and mine design of compressor unit.

ROOF-BOLTING PROVED to be the solution to mounting mining costs when bad top conditions encountered in No. 9 drift of the No. 5 mine of the Red Parrot Coal Co., Prenter, W. Va., complicated tonnage production so much that economical operation was seriously threatened.

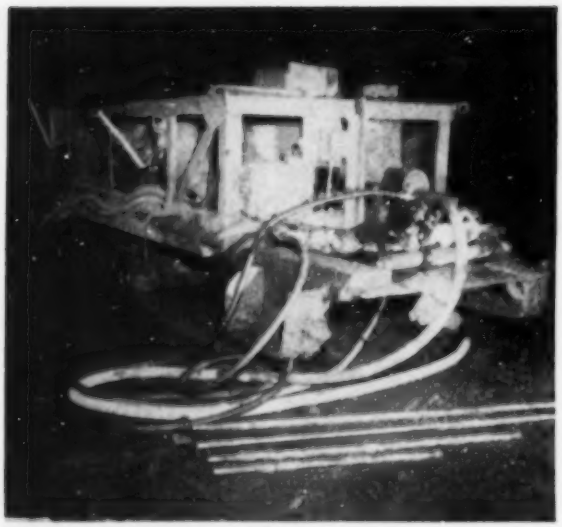
Character of the roof strata is such that it cannot be bound together to form a beam but instead must be suspended with long bolts from the solid sandstone above. A crawler-mounted unit, built at the mine to carry the air compressor, tools and the water tank for wet drilling, licked the difficulties with a soft and rather wet bottom and improved bolting performance over the original compressor arrangement. Time studies also were an important factor in developing an efficient procedure.

Mining is in the No. 5 Elock seam lying practically level, and coal in the No. 9 Drift is 4 to 6 ft thick. Areas are irregular and are bounded for the most part by outcrops, with mountainous cover that ranges up to 500 ft. The troublesome top consists of 3 to 5 ft of weak shale and some coal, but above it there is a strong, massive sandstone. A typical section of the bad top is shown in one of the photographs above, taken where the roof was shot out for a loading head. In this place, the top consists of 34 in of slate and 12 in of coal.

Roof-bolting is being installed to hold the top in the five headings of a main entry. The coal is undercut, center-sheared, shot with permissible, loaded by Joy 14 BU machines into 3-ton Joy 4-wheel-drive 4-wheel-steer shuttle cars and elevated into mine cars on a circle-haulage layout. Headings are 18 ft wide at the bottom, which normally results in a 16-ft width at the top. Cutting machines are Joy 11 RU units with 9-ft bars equipped with Cincinnati chains and Bowdil throwaway bits.

ROOF FALLS SLOWED PRODUCTION

Bolting was begun in July, 1949, after bad roof was found to be seriously interfering with production. Holding the roof had been first attempted with posts, then with 4 x 8-in by 14-ft rough headers and, finally, with 6 x 8-in by 14-ft sawed headers set two per cut, or, in other words, on 4-ft centers. The sawed headers served fairly well until development encountered slips and some water coming through the top. After an advance of about 100 ft,



IMPORTANT FACTOR **DESIGNED TO LICK** soft wet bottom that made tough going for rubber-tired unit, mine-built crawler-mounted compressor and roof-bolting machine is shown at the face, with drill steels laid out ready for use and stoper and impact wrench on front deck where they are carried. Hooks on the sides are for coiling the 300-ft trailing cable (left photo) and for air and water hoses serving the stoper and impact wrench (right photo). James H. Hurley, assistant safety director, stands back of the unit.

TYPICAL EXAMPLES **PERMANENT TRACK,** which has been extended to within 25 ft of the loading elevator, is protected by bolted roof. Track is 40-lb rail, on 42-in gage. In right photo, Carl E. Morgan, general mine foreman, tests for gas at face where several of the eight bolts used per 8-ft cut have been installed. The safety post will be removed by the cutting-machine men who arrive next. So far, no gas has been detected in the No. 9 drift.

the headers would bend and later many of them would break. The resulting falls in airways and haulways increased mining costs out of proportion to the price of coal at that time and foretold serious difficulties when the mine would become larger.

After consultations with representatives of the Bureau of Mines, the West Virginia Department of Mines and the Acme Machinery Co., Williamson, W. Va., a small area was bolted under a temporary permit from the state department. Daily inspections soon indicated that bolts properly applied would hold, and as a result the two shuttle-car sections of the mine were set up for bolting on the production cycle. Several changes in equipment and methods were made before the present successful application was achieved.

BOLTING METHODS REVISED

The pattern for all bolting has been eight bolts per 8-ft cut, with bolts set 2 ft from the ribs and all on 4-ft centers each way. At first, 4-ft bolts were used and the rib holes

Red Parrot Roof-Bolting

Summary of Time Studies During 3 Shifts

	Average per Shift
Number of places bolted	9
4-ft bolts used	55
5-ft bolts used	12.3
Total bolts used	67.3
Average bolts installed per place	7.48

WORKING TIME:	Average per Shift Min:	Per Cent
Drilling holes	140.6	29.36
Preparing to drill holes	20.2	4.22
Placing bolts in holes	16.2	3.37
Placing plate and tightening nut	8.4	1.76
Moving stoper	19.8	4.13
Moving to new places	31	6.46
Taking on water	3.8	0.79
Changing bits	4.7	0.98
Total working time	245	51.07
DELAY TIME:		
Man-trip	69.5	14.48
Mechanical delays	71.5	14.91
Oiling and greasing	7.1	1.49
Handling supplies	5.3	1.10
Incidental to moving	11.6	2.42
Taking centers	5.6	1.17
Waiting on loading machine	4.1	0.86
Lunch period	30	6.25
Stagger loading machine crew	20	4.17
Weak power	2.7	0.57
Miscellaneous	7.2	1.51
Total delay time	235	48.93
Total available working time	480	100.0

were angled 45 deg toward the rib line on the assumption that the top would hold if the strata were bound together to form a beam. Numerous failures after advances of 200 to 300 ft showed that the top did not form a beam, perhaps as a result of the conglomerate character of the slate and the failure of it and the overlying coal to provide effective anchorage for the bolts.

Accordingly, it was decided to install bolts of sufficient length to be anchored into the strong, massive sandstone and to discontinue angling the rib bolts, which was complicating the job and was believed to be of no benefit. Now, bolting is considered wholly as a suspension and holes are drilled no less than 8 in into the sandstone.

Some difficulty was experienced with falls between bolts. Consequently, wood caps were tried and, later, steel channels. The present standard is 6 x 6 x ⅜-in steel washers. Experience indicated that in a few places where the slate is especially weak it will slough down between supports, regardless of the wood caps, channels or washers.

Drilling is done with stopers, and 1-in wedge-slot-type bolts with hex nuts are used. For the most part, 5-ft bolts now are installed, but many places require a 6-ft length to obtain 8 in or more anchorage in the sandstone. At the end of each week, all bolts installed during that week are checked with a torque wrench. With this successful application, maintenance of roof support has been practically eliminated. In considering the results, there is no point in comparing costs of bolts against wood supports, because the wood did not hold and its maintenance was excessive and continuous.

MINE-BUILT COMPRESSOR SPEEDS WORK

Perfecting the equipment had a great deal to do with working out a bolting practice that enables two men to bolt ahead of the cutting machine. The accompanying summary of time studies covering three shifts within a week shows an average of nine places bolted and an average of 67.3 bolts installed per shift. Up to the time this article was prepared, the average had increased to 75 bolts per shift and in one favorable shift 103 bolts were installed.

The first compressor mounting was on rubber tires and the unit had to be pulled from place to place, which involved a great loss of time. In addition, since the bottom was soft and the mine rather wet, there was high maintenance on the rubber-tired truck and in keeping the roadways passable. The solution was to mount a compressor on a crawler truck.

This unit, using a 210-cfm water-cooled compressor furnished by the Acme Machinery Co. and a Joy Class T1 crawler truck, was designed and built in the coal company's shop under supervision of V. R. Rogers, at that time chief electrician for the company and now superintendent of its Red Cedar mine at Keith, W. Va.

Instead of using a motor big enough to provide maximum capacity, the compressor drive employs a 40-hp motor which supplies 165 cfm, a quantity ample for the job. A 100-gal water tank for wet drilling is mounted at a back corner of the unit. Installed on one side of the housing are hooks for the water and air hoses and on the other side are hooks for 300 ft of trailing cable. At the front or control end, a flat deck provides space for carrying tools and for the operator to ride.

Drilling is accomplished with a Le Roi Cleveland S11s stoper equipped with telescopic leg and a straight clutch without collar, a preferred arrangement in using water to allay dust. Nut tightening is done with a Chicago Pneumatic CP-365RP Model B reversible impact wrench. In drilling a 5-ft hole, drill steels 24, 36, 48 and 60 in long are used. Bits are Liddicoat throwaways furnished by the Acme Machinery Co. A hole is started with a 1⅝-in bit and finished with a 1¼-in.

Up to Feb. 15 of this year, after 2 yr of roof bolting, 97,542 bolts had been installed in the mine and 347,062 tons of coal mined from the roof-bolted area.

C. G. Evans is general superintendent of the Red Parrot Coal Co. J. A. Gothot is chief engineer; G. E. Daugherty, safety director; and James H. Hurley, assistant safety director. Carl E. Morgan is general mine foreman and Arnold Rush, chief electrician, at No. 5 mine. Red Parrot is controlled by the North American Coal Corp., one of the "Top 15" coal producers in the country. A. J. Ruffini, vice president, is in charge of operations.

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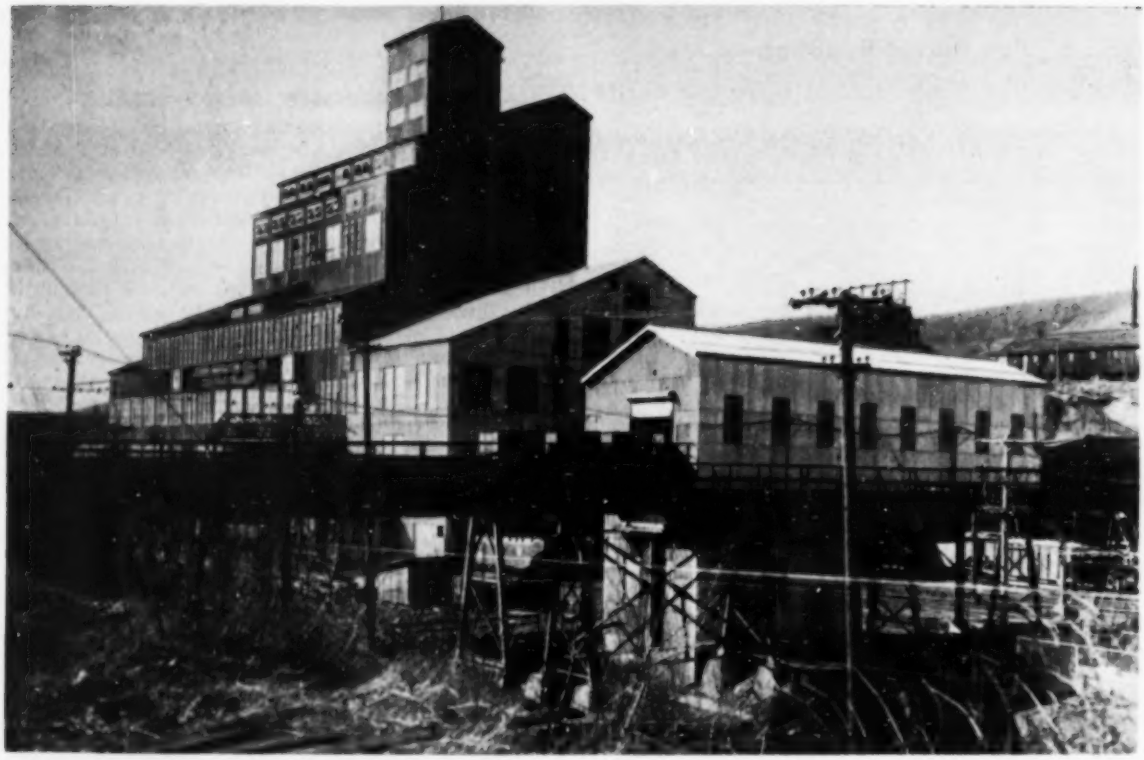
Reclaiming Strip Land

The nation's first surface mining reclamation program was begun in Indiana in 1918 with the planting of peach and pear orchards that are still producing, Bituminous Coal Institute reports. Of the 50,000 acres of land strip-mined since that time, more than 40,000 have been revegetated, 5,000 have been devoted to public recreation and 1,500 have been converted into residential sites.



NEW ROCK-DISPOSAL AND CAR-CLEANING STATION (foreground) at Coaldale colliery is a result of Lehigh Navigation's policy of continuously analyzing operations in search for better ways of doing things.

Lehigh Navigation increases efficiency with a new station for . . .

Better Rock-Disposal and

New auxiliary unit at Coaldale cleaning plant is equipped with a 2-car rotary dump to permit one car of rock to be dumped while another is cleaned inside by a high-pressure water spray. The benefits are increased car capacity and lower overtime labor costs.

YOU CAN achieve increases in efficiency in unassuming places if you (1) keep your mind open to the realization that efficiency can be raised and costs can be cut, (2) take nothing for granted as far as previously-accepted methods are concerned, and (3) investigate fully all the possibilities you see. By following these basic principles, officials of Lehigh Navigation Coal Co., Inc., Lansford, Pa., were able to come up with a new rock-disposal and car-washing station at Coaldale colliery which makes a respectable contribution to higher efficiency and lower costs. Here's how it came about.

Coaldale mine produces about 100 cars of rock per day from development places, such as tunnels and gangways, in addition to the rock which runs with the coal from the steeply pitching working places. Of course, the rock which comes out in the coal cars must be dumped into the breaker feed skips, but cars containing development rock formerly were sidetracked while the breaker operated and were dumped off-shift by overtime labor. As any operator knows, excessive overtime labor mushrooms like compound interest. Furthermore, the rock cars were out of service until they could be dumped and they took up space on the sidings.

A parallel problem was the layer of fines that built up in the bottoms of the coal cars as a result of wet coal. The layer of fines often would not leave the cars as they were dumped into the breaker feed by rotary dump, thus materially reducing their capacity for their next trip into the mine. Car-cleaning, therefore, also required overtime work, and doing the job with a firehose at the regular dump was messy and wasteful of water.

Briefly, the new installation is an auxiliary unit equipped with a 2-car rotary dump. In the leading bay of the rotary dump, the rock cars are unloaded into a rock hopper, and, in the following bay, the cars are cleaned

TRACK BARNEY feeds trips of rock cars to rotary dump in the building. The cars come out the other end scrubbed clean.

Better Car-Cleaning

inside by a high-pressure water monitor nozzle. The washings fall into another hopper. So, on each rotation of the dump, one car of rock may be unloaded while another car is cleaned. Two men operate the new station during the single shift worked by the breaker. Rock is trucked to disposal areas and solids in the washings are split at 9/16 in. Plus 9/16-in material is trucked to the breaker-feed hopper and minus 9/16 is pumped to the Coaldale breaker fine-coal plant.

STATION PROCEDURE

Let's take a closer look at the physical structure and operation of the plant.

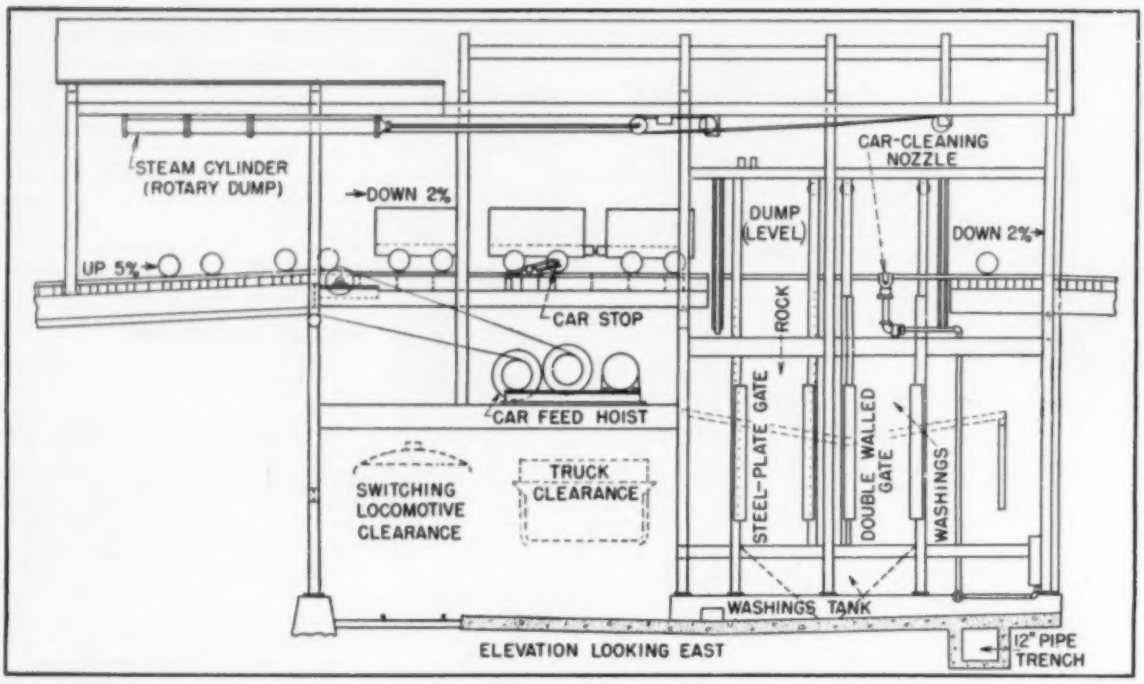
As shown in the illustration, the station is elevated to provide hopper capacity and pump space underneath and to clear a railroad track and a truck road which pass under the mine-car track leading into the rotary dump. The steel mine cars (ACF), which have a coal capacity of 5 tons, are equipped with swivel-type couplings to make it possible to dump a complete trip without uncoupling.

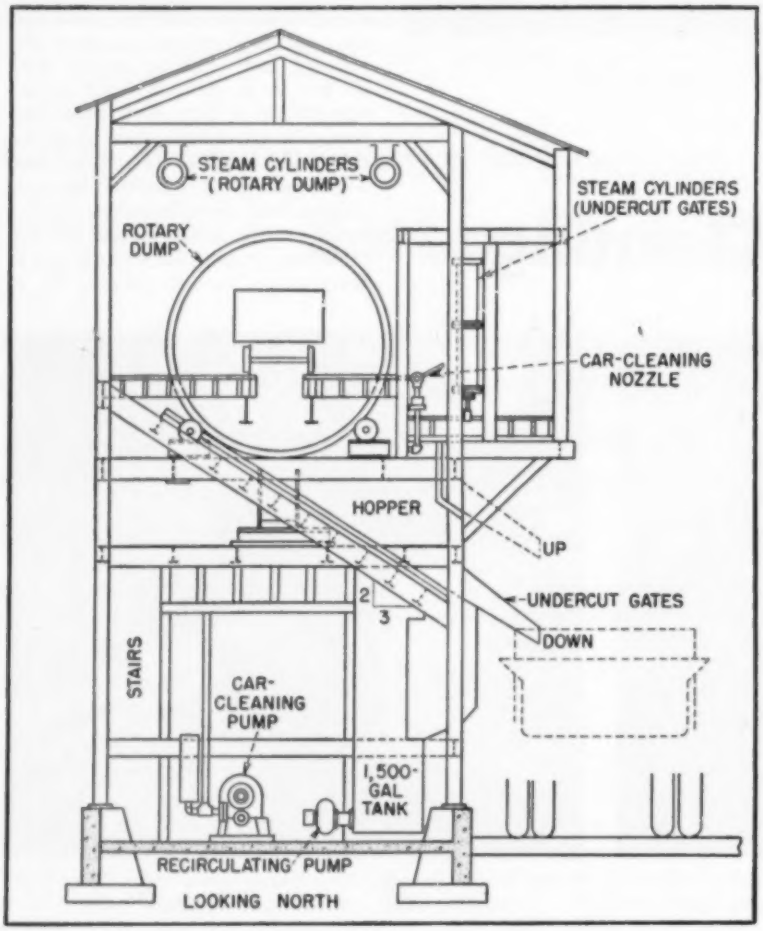
The rock cars are shunted out of the trips approaching the breaker-feed dumping point and gathered into trips, which are then pushed to the disposal and cleaning station until the first car is engaged by the barney operated by a Fory feed hoist. The hoist-powered barney then feeds the cars one at a time to the rotary dump.

The dump is operated by two single-acting steam cylinders, one for turning to the dump position and the other for returning the rotary dump to horizontal. One man operates the 4-

MAIN FEATURE of car cleaner is monitor nozzle with shopmade manifold which directs the spray.

PUMP ROOM contains 75-hp cleaner pump (left), 15-hp recirculating pump and 1,500-gal "washings" tank.



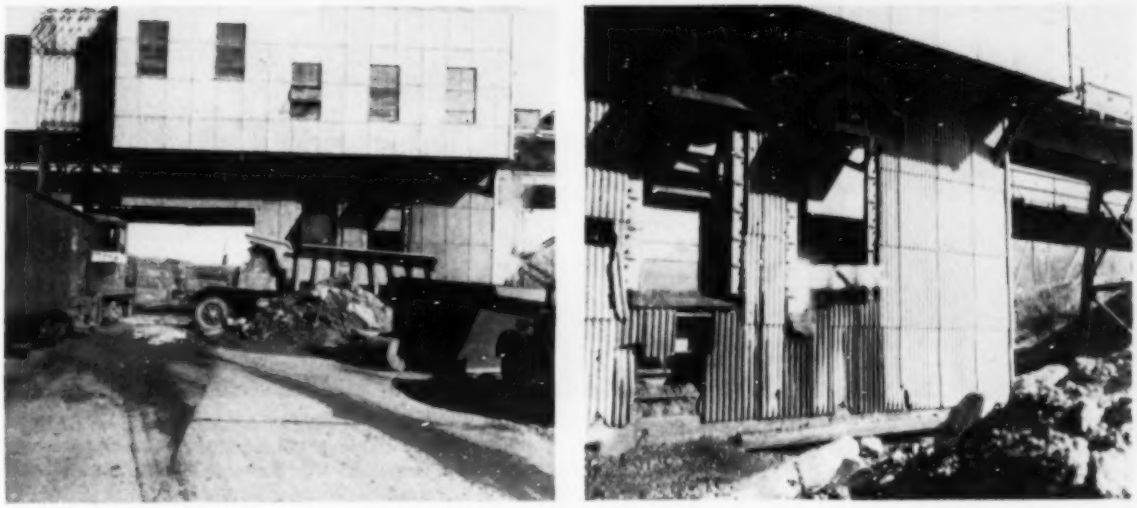


SCHEMATIC DIAGRAMS show layout of equipment for disposing of development rock and cleaning mine cars with a high-pressure spray.

way valve which controls the steam cylinders and the controller for the feed hoist. Ropes for turning the rotary dump are reeved in such a manner that equal turning effort is exerted at both ends of the dump.

As mentioned, the second bay of the 2-car dump is the car-cleaning station. As the dump rotates to unload the car in the first bay, the interior of the empty car in the second bay is presented to the high-pressure spray which issues from the manifold on the monitor nozzle. The monitor nozzle is mounted on the structural framework of the station at the midpoint of the second bay, and is fitted with a handle by which the nozzle may be rotated about a horizontal axis in directing the spray across the width of the car. A shopmade manifold, through which the nozzle discharges, is equipped with nipples having ½- and ¾-in openings. Five of these nipples are arranged on the manifold to spread out the spray across the length of the car.

Water is fed to the nozzle at 210 psi by a 4-in 350-gpm Barret-Haentjens four-stage centrifugal pump, which is driven by a 75-hp motor. The water is taken from a supply main.



UNDERCUT GATES discharge material from hoppers under rotary dump. Right photo shows gates closed. The gate at the right is double-walled to conduct water and minus 9/16 fines into washings tank for recirculation to fine-coal plant.

TRUCKS HANDLE REFUSE

The rock and the washings drop from the cars into separate compartments of a sloping-floor hopper under the dump. Material is discharged from either compartment of the hopper into trucks through undercut gates which are opened and closed by individual steam cylinders. The trucks are those which haul breaker refuse away from the Coaldale cleaning plant. On their return trip, they are signaled to a stop at the new station whenever the hoppers require unloading.

The undercut gates slide up and down under the action of the steam pistons, and as either gate moves downward the material in the compartment flows over the top of the gate and over the lip chute into the truck.

The gate for the rock compartment is a solid steel plate, but the gate for the washings compartment is somewhat more complicated. It is double-walled, with a solid steel plate on the outside and a perforated plate inside. The perforations consist of three 12 x 12-in holes at the top covered with 9/16-in mesh jackets. As the washings flow from the car into the hopper, the water and minus 9/16-in material flows through these openings and down between the walls of the gate into a 1,500-gal tank. Plus 9/16 material is retained in the hopper to be loaded into a truck when the double-walled gate moves downward under the action of the steam piston.

The 1,500-gal tank, which receives the water and minus 9/16-in fines, is a feed reservoir for a 4-in Barret-Haentjens recirculating pump that lifts the water and fines to the new Coaldale breaker fine-coal plant for final cleaning. Thus the water used for car-cleaning makes up part of the total water requirement of the breaker. The pump is rated at 350 gpm under a 72-ft head and is driven at 1,500 rpm by a 15-hp motor. It is controlled by a float switch, with the float in the tank. As previously mentioned, plus 9/16-in material is trucked to the breaker feed pit.

Valves which actuate the undercut gates are operated by either the dump operator or the car cleaner, the only men in the station.

From 80 to 100 cars of rock per day are produced at the colliery, but the men in the station can handle up to 160 cars in a shift. The difference is made up by shunting the dirtier coal cars through the cleaning station after they have been dumped into the breaker-feed pit. The coal cars to be cleaned are selected by one of the cleaning-station operators, who inspects empty cars to find those with particularly heavy layers of built-up fines.

WHERE BENEFITS SHOW UP

In particular, here's how the benefits of the new facility show up. Under previous methods, when rock was dumped off shift, the rock crew waited for the end of the breaker shift. Coal is fed to the top of the breaker by skips which load at a skip pocket into which the coal cars are dumped by a rotary dump. The first duty of the rock crew was to hoist into the breaker any coal remaining in the pocket and to run this coal over the main shakers. Then they could swing the deflection gate at the skip discharge point to open the rock circuit in the breaker. Finally the rock was dumped into the skip pocket, hoisted to the top of the breaker and fed down through the rock circuit to railroad cars. At the end of this cycle, the crew would have to refill the skip pocket with coal so that the breaker would not be short the next morning.

It is evident that the new station eliminates the cost and efficiency drawbacks inherent in the former methods. And the increased capacity in the cars cleaned each day adds a fair tonnage to total daily production. More important, however, is the fact that the company no longer is forced to pay repeatedly for that layer of fines in a car which never got to the breaker, since the mine car is one of the units of measurement in figuring a miner's pay.

The new facility is a product of the combined efforts of the operating, preparation and mechanical departments of LNC. It was designed and erected by the mechanical department, headed by W. E. Connor, superintendent. Adam G. Frank is assistant mechanical superintendent, and E. E. Rickert is mechanical engineer. Ben Mitchel, outside foreman, Coaldale, supervises operations at the new station.

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Women prefer men who have something tender about them—especially legal tender.

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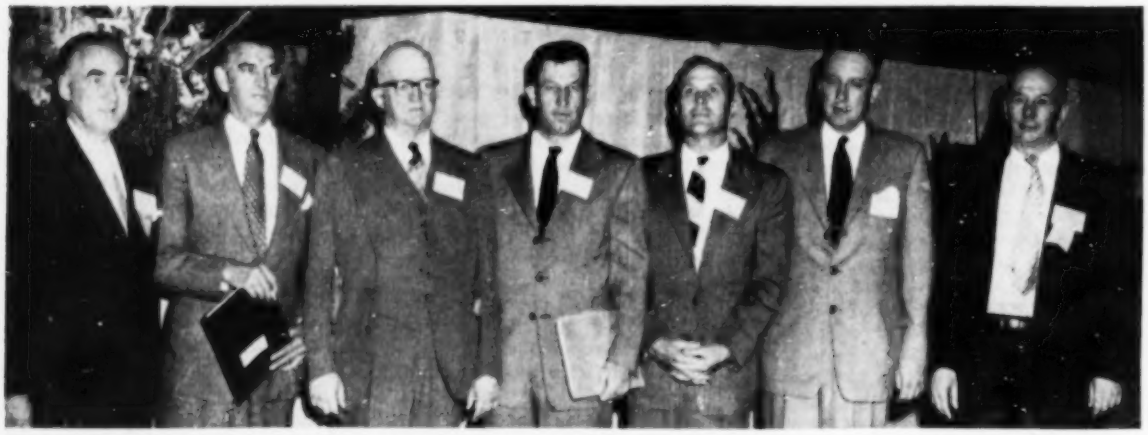
CONTINUOUS MINING—H. A. Treadwell (left), Chicago, Wilmington & Franklin Coal Co., session chairman; Richard Todhunter Jr., Barnes & Tucker Co., floor committeeman; M. H. Forester, Pittsburgh Consolidation Coal Co.; Russell Herby, Pennsylvania Coal & Coke Corp.; W. B. Jamison, Jamison Coal & Coke Co.; J. B. Sutton, Clearfield Bituminous Coal Corp.; and P. L. Alspaugh, Carbide & Carbon Chemicals Co.



ROOF SUPPORT AND PILLAR RECOVERY— R. E. Salvati (left), Island Creek Coal Co., session chairman; E. R. Cooper, Jones & Laughlin Steel Corp.; J. C. Hunter, Powellton Coal Co.; R. F. Bowie, Union Pacific Coal Co.; Herman E. Knight, Bell & Zoller Coal & Mining Co.; R. M. von Storch, The Hudson Coal Co.; and Glenn B. Southward, American Mining Congress.

COAL PREPARATION—Bradley Sparks (left), W. G. Duncan Coal Co., session chairman; R. L. Llewellyn, Eastern Gas & Fuel Associates; Clayton Slack, Sahara Coal Co.; W. T. Turrall, Lehigh Navigation Coal Co.; Matthew Turkovich, Island Creek Coal Co.; Wendell E. Bearce, Hanna Coal Co.; J. B. Taggart, Wise Coal & Coke Co.; and R. G. Pfahler, Berwind-White Coal Mining Co., floor committeeman.

UNDERGROUND HAULAGE AND POWER—C. E. Walker (left), Jewell Ridge Coal Corp., session chairman; R. Pearson, Bethlehem Mines Corp., floor committeeman; D. H. Davis, Mathies Coal Co.; Frank La Roche, Snow Hill Coal Corp.; Joseph Craggs, Peabody Coal Co.; H. A. Jones, Carbon Fuel Co.; H. W. Buckingham, Tennessee Coal & Iron Div., U. S. Steel Corp.; and Elton L. Parker, Westinghouse Electric Corp.

AMC Meet—Mining Milestone

Coal industry and its allies measure machine-mining progress and glimpse still better future as American Mining Congress stages convention and equipment show

MORE MACHINE-MINDED AND PRECISION-PREPARED COAL at lower cost loomed in the industry's future as 13,127 coal men, machinery and equipment manufacturers, and representatives of related interests, including a liberal sprinkling of UMWA officials, thronged into Cleveland, Ohio, for the four-day convention and exposition of the American Mining Congress, May 11-14.

Coal men crowded the aisles of the big exhibition hall, where 262 manufacturers and suppliers showed an estimated $20,000,000 worth of machinery, equipment, materials and supplies for stripping, deep-mining and preparing coal; modifying, servicing and maintaining machines and equipment; and protecting men from accidents and machines from damage.

They also listened through nine technical sessions as mining men and manufacturers' representatives talked about machine mining, roof support and pillar recovery, safety, strip-mine haulage, trends in design for shovel dippers and dragline buckets, overburden drilling, underground haulage and power, continuous mining, coal preparation, management principles and anti-stream pollution measures.

Total effect of the convention and exposition was to confirm the fact that coal yields to no other industry in modernization. The men of the industry are machine-minded. They run their mines and plants with skill and imagination. And the manufacturers and suppliers who serve them stay abreast of their needs.

In the following pages, *Coal Age* publishes its on-the-scene report of the big meeting. Digests of the technical papers begin on this page; a review of machines and equipment shown, on p 106.

More From Continuous Mining

"The full benefits of the change from conventional mechanical mining to the new principle of 'continuous' mining cannot be derived, until certain phases are developed further and solutions to inherent problems found."

In a review and forecast of continuous mining, M. H. Forester, vice president, Pittsburgh Consolidation Coal Co., pointed out that 172 continuous-type mining machines were delivered to the coal industry between Jan. 1, 1948, and Jan. 1, 1953, and that they have been tried in 92 mines in 30 seams ranging from 39 to 108 in in thickness. Discussing the problems of face transportation, roof control, product size, outages, maintenance, ventilation and so on, Mr. Forester offered three underground mining systems envisioned for the future. They were:

1. Auger mining with one machine boring in opposite directions and requiring a heading with a minimum width of 17 ft and a minimum height of 5 ft. Some 2,000,000 tons of coal were auger-mined from highwalls in 1952, but to the best of his knowledge, Mr. Forester stated, there are not over three augers working underground.

2. Combined operation with a conventional continuous miner working straight ahead and augers mining the crosscuts and getting 55% of the pillars.

3. Adaptation of the Carbide remotely controlled miner (*Coal Age*, December, 1952) to underground use.

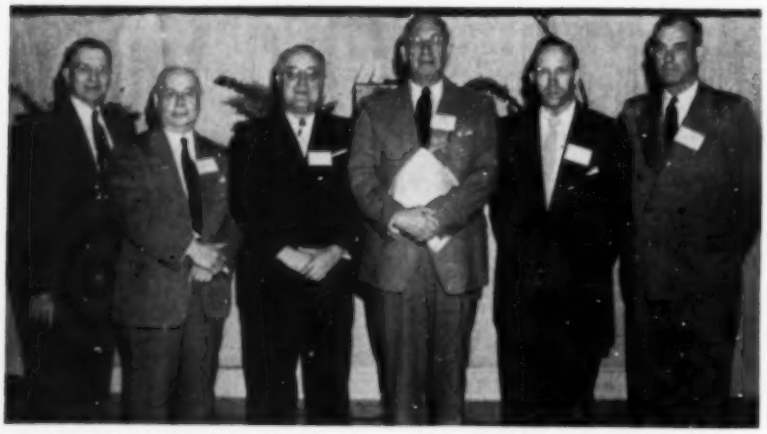
Based on a study of 55 continuous miners, Mr. Forester stated that the cost comparison with conventional mining under similar conditions is as follows:

	High Coal	Low Coal
Production labor	Down 40%	Down 20%
Production supplies	Down 16%	Up 20%
Maintenance labor and supplies	Up 43%	Up 62%
Power	Up 4%	Up 8%
Other operating costs	Down 11%	Down 7%
Total production cost	Down 25%	Down 6%

Continuous mining at the Pennsylvania Coal & Coke Corp. was aimed at the problems encountered in 36- to 42-in coal, declared Harold B. Wickey, in a paper read by Russell Herby, general superintendent. In low coal, the direct face cost may be reduced 50% or

SAFETY—*Left photo*: M. L. Alley (left), Gauley Mountain Coal Co., floor committeeman; M. H. Fies, Alabama Power Co., session chairman; G. R. Spindler, West Virginia University; James Westfield, U. S. Bureau of Mines; Charles T. Holland, Virginia Polytechnic Institute; and H. E. Mauck, Olga Coal Co.

LABOR RELATIONS AND MANAGEMENT—*Right photo*: Thomas E. Larkin (left), umpire, Anthracite Conciliation Board; L. C. Campbell, vice president, Eastern Gas & Fuel Assoc., session chairman; Paul Weir, Paul Weir Co.



STREAM-PURIFICATION PANEL—T. C. Cheasley (left), Sinclair Coal Co.; Henry F. Hebley, Pittsburgh Consolidation Coal Co.; J. J. Foster, Island Creek Coal Co.; E. R. Price, Inland Steel Co., panel chairmen; W. E. Bearce, Hanna Coal Co.; and L. E. Sawyer, Indiana Coal Producers' Association.

MECHANICAL MINING—R. C. Luther (left), Peerless Coal & Coke Co., floor committeeman; Carl T. Hayden, Sahara Coal Co., session chairman; Mack H. Shumate, Truax-Traer Coal Co.; W. J. Shields, Rochester & Pittsburgh Coal Co.; Emmett T. Lang, Powhatan Mining Co.; and William L. Husk, West Kentucky Coal Co.

more, while face-support cost may increase. Overall, the continuous miner will show a decrease in production costs as compared to conventional methods.

Since present continuous miners require all the available headroom when operating in low coal, maneuvering and providing proper maintenance and lubrication are difficult. Transportation still is a problem, but the use of a conventional loader back of the miner has the advantage of keeping the working place clear of coal and the shuttle-car roadways in good shape. However, the loader may obstruct ventilation and interfere with quick removal of the machine under threatening roof conditions.

Roof-bolting kept to within 50 ft of the face and not more than 8 hr behind the fresh face has proved of real help in roof control in continuous mining. Ventilation has not proved a serious problem, although more than 6,000 cfm minimum is needed to remove the dust rapidly from the face area. Dust-allaying is being done with high-pressure sprays and experimentally through a dust-collecting system. Maintenance cost is high, Mr. Wickey declared. In the early stages, it was necessary to overhaul machines every 40,000 to 60,000 tons, but with improved design, plus better maintenance, the tonnage has been raised to 125,000.

General Electric tractor-tread shuttle cars have provided the answer to operation with very-soft, wet bottom at No. 21 mine of the Jamison Coal & Coke Co., Latrobe, Pa., said W. B. Jamison, vice president. Second mining is being done in a 7-ft seam originally opened in 1890, worked intermittently during the 20s, closed in 1933 and reopened in 1942. Rubber-tired shuttle cars were a failure in serving the continuous miner. The treads of the tractor-tread cars, with pads 12 in wide, seem to pack the fireclay and other material, making ruts which appear to have an advantage as a track or guide for equipment. The Joy miner and also the 7 BU loader get stuck sometimes because of the greater weight and narrower

treads that appear to let the material squeeze up around the pads.

Recovery percentage has increased one-third compared to recovery with track haulage. The coal is soft and bit life and maintenance with the Joy miner is excellent. Mr. Jamison stressed the 7-ton load capacity of the General Electric car in relation to its overall dimensions.

A new-type mobile continuous conveyor used in a conventional mining plan and experimentally in a continuous room-and-pillar system was presented by James D. Sutton, electrical engineer, Clearfield Bituminous Coal Corp., Indiana, Pa. In mining with this unit, a 300-ft chain conveyor is mounted in a straight line on wheels and is pulled along on the mine bottom to follow the face machine, handling the coal from a 200-ft advance without stopping. The coal is unloaded from the chain conveyor to a cross or other conveyor by a tripper or unloading unit that remains stationary, with the chain conveyor moving forward under it.

The experimental layout for this mobile continuous conveyor provides for driving rooms 1,800 ft between two flat entries. Pillars are to be mined by installing a second set of retreating mobile continuous conveyors. To date, the system has not been tried with continuous-mining machines, but Mr. Sutton declared that there is no reason why it cannot be done.

In enumerating some of the advantages of the unit, T. F. McCarthy, Clearfield vice president, pointed out that there are few working parts, the conveyor is readily moved ahead, the system is adaptable to either hand or machine loading, shuttle cars are eliminated, the accident rate should be less than with shuttle cars, and the operating time for continuous miner should be stepped up far above the 30 to 40% with shuttle cars. The principal limitation is rigidity and straight-line travel.

In reporting on the remotely controlled Carbide miner, P. L. Alspaugh, manager, Coal Utilization Projects, Carbide & Carbon Chemicals Co., S. Charleston, W. Va., stated that development is still going on and that the company is not yet ready to talk about any arrangements for manufacturing or marketing of the machine.

Although a penetration of about 700 ft into the highwall is the maximum achieved with the present No. 3 machine, there is some limitation on the ultimate increase. Mr. Alspaugh said, however, that 1,000 ft is practical and 1,500 ft is not considered unreasonable. An improvement is an automatic course-control that does a better job than an operator.

Stepping Up Haulage and Power

"It is far easier to operate a mine if everyone knows that the haulage system is practically trouble-free."

The haulage system at Mathies mine, said D. H. Davis, executive vice president, Mathies Coal Co., Finleyville, Pa., moves 13,000 to 14,000 tons gross and 9,000 tons net per day without the services of a fulltime dispatcher. Each of the three mainline locomotives in use is manned by one operator, who leaves empties and picks up loads without extra help except for occasional assistance from the swing-haulage crews.

One 26-ton single locomotive pulling 35 cars, each carrying 10 tons, hauls 20,000 ft and averages six round trips per shift. A 40-ton tandem pulling 40 to 45 cars per trip hauls 25,000 ft and averages five round trips. A third 30-ton unit, 30 to 40 cars per trip, hauls 32,000 ft and makes 4 to 5 round trips. Maximum speed of a 40-car loaded trip, with an adverse grade of 1.27%, is 15 mph. A 50-ton 8-wheel swivel-truck single-unit locomotive is on order for use on this adverse grade.

The mine will have a one-way haul of 8 to 9 mi for all the coal. A double-track system is installed, with 85-lb rail on the loaded road, on all curves, and on about 3 mi of the empty road. The remainder of the empty main line is 60-lb. Joints were Thermit-welded for some time, but now are being arc-welded with temperature control to relieve heat stress. As a result, no failures have occurred in the arc-welded joints.

The 6 x 8-in by 6-ft creosoted ties are laid on a minimum of 6 in of slag ballast compacted by air tamping. If any water appears along the roadbed it is taken care of permanently by installing an automatic pump in a sump dug 5 to 6 ft deep in the nearest crosscut and covered with concrete. Roof support on 30,000 ft of both the empty and loaded roads consists of 6 x 6 H-beams on 10-ft minimum centers and supported on pin rails in the ribs or on piers. Roof-bolting without other support is now permitted in the mine. Consequently, main entries are now bolted with no other support other than steel beams at the crosscuts.

Mr. Davis emphasized the fact that each locomotive at Mathies is equipped with a trolleyphone. The haulage system at Mathies, he declared, "is being built so that mainline haulage is not a bottleneck to production." Answering a question, he said that wheel-flange wear on one side of the cars still is an unsolved problem, and that wear can get so bad that power is required to move trips down a 2¼% grade. This results, among other things, from the fact that panels are mined on only one side on the advance, leaving the other side for final retreat.

First taking an existing 3-mi haulage system, Frank La Roche, superintendent, Snow Hill Coal Corp., Terre Haute, Ind., then speculated on the system that might be used in the mine of the future. It should be possible, he felt, to achieve completely automatic track haulage with large cars, and with the equipment operating at only about 4½ mph and provided with automatic dynamic braking and other devices for proper control and spacing.

Belt haulage, said Mr. La Roche, is not the overall answer, since a number of mines are returning to track. Instead of high-speed haulage, the emphasis should be on "efficient haulage" through a scheduled standard-trip system. For the mine with the 3-mi haul, double track may be the ideal, but with a proper arrangement of passing tracks with electric switches it is possible to eliminate brakemen or tripriders. Sufficient cars for storage are a vital ingredient for a properly scheduled system. Putting locomotives in tandem is the best answer to better results with existing equipment. With the right equipment, including electric switches and radio telephones, dispatchers will not be necessary.

"Highly satisfactory" was the way Joe Craggs, assistant division superintendent, Peabody Coal Co., Taylorville, Ill., summed up belt haulage at the company's new No. 10 mine, operating in 7½ ft of coal. Although functioning at less than rated capacity, the system already is moving 11,000 tons daily on a two-shift basis. Shuttle cars discharge to 36-in belts followed, in succession, by 42- and 48-in belts, with final haulage up the 16-deg slope 1,729 ft long and rising 475 ft, by a 48-in belt with steel-cable reinforcing. Three 250-hp motors at ground level and working through a dual-tandem drive, operate the belt at 465 fpm.

Labor for a typical 42-in belt installation, 150-hp tandem drive, is as follows: drilling, tamping and shooting for form for drive and head pulley, 8 man-shifts; loading clay, 4 man-shifts; building forms and pouring concrete, 16 man-shifts; wiring, 5 man-shifts; setting drive machinery and 1,500 ft of conveyor line with belt, 129 man-shifts.

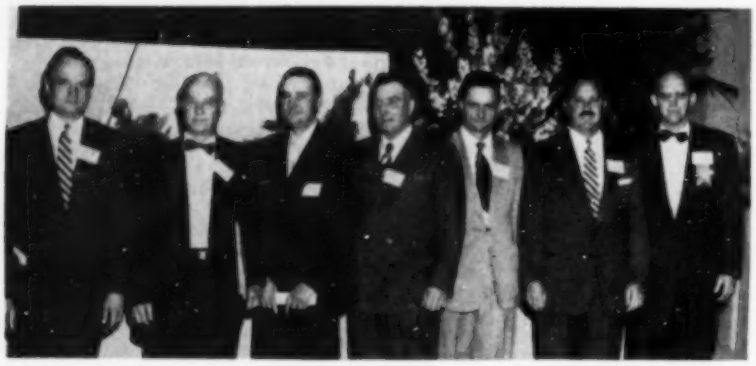
Unlike many belt mines, Mr. Craggs pointed out, No. 10 is equipped with track for handling men and supplies. "It has been a very encouraging experience for us, after years of headaches from handling supplies over a single-track haulage system, to have now at No. 10 mine a separate and totally independent artery for our material cars to and from the face. It is worthy of note that all supplies are handled underground on shift by four men, who also are responsible for the man trips."

At the track end, immediately inby the mouth of a room entry, supplies are transferred to rubber-tired equipment by a 1-ton electric hoist suspended from a monorail hung from the roof. Most of the bulk supplies are packaged in bundles or are placed on pallets. The section supply cars are battery shuttle cars no longer used for coal haulage.

Handling of supplies and men by rail in a 12-yr-old belt-haulage mine in the 36-in Powellton seam, using AC face power, and by rubber-tired tractor in a 5-yr-old belt mine in the 5-ft Dorothy seam, using DC face power, was described by H. A. Jones, general superintendent, Carbon Fuel Co., Carbon, W. Va. With the track system, low-type battery locomotives and cars with flat bottoms only 9 in above the rail are used. No top is taken in the mine. As to results, said Mr. Jones, "notwithstanding the extra expense of installing and maintaining this dual transportation, and

BUCKETS AND DIPPERS—J. D. Reilly (left), Hanna Coal Co., panel chairman; C. J. Polinek, Page Engineering Co.; Karl Schneider, Harnischfeger Corp.; R. M. Dickey, Bucyrus-Erie Co.; A. F. Busick, Marion Power Shovel Co.; and Paul V. Larsen, Electric Steel Foundry Co.

STRIP HAULAGE—Hugh B. Lee (left), Maumee Collieries Co., session chairman; R. C. Gessel, R. G. LeTourneau, Inc., A. S. McClimon, Euclid Road Machinery Co.; Ralph H. Kress, Dart Truck Co.; E. E. Howard, Caterpillar Tractor Co.; P. W. Chesney, Shen-Penn Production Co., panel chairman.



HIGHWALL DRILLING—W. G. Gerow (left), West Virginia Coal & Coke Co., floor committeeman; G. H. Utterback, United Electric Coal Cos.; Robert Akre, Maumee Collieries Co.; Merle Busby, Ozark-Philpott Mining Co.; Marlin Carter, Ayrshire Collieries Co.; Fred Horne, Sinclair Coal Co.; and W. J. Crawford, The Enos Coal Mining Co., session chairman.

considering the existing conditions, the results have been most satisfactory and the extra expense justifiable. It is a relatively low-cost mine and we have not had serious haulage or belt accidents."

Maximum haul in the mine in 5-ft coal is now 6,000 ft, average production is 1,200 tons, and the life expectancy is 7 or 8 yr. The battery-powered tractors with trailers were selected because the 5-ft seam permits easy travel for men and supervisors, and because of the short haul and small quantities of material necessary for roof support. "The battery-powered rubber-tired tractors with trailer-car attachments have withstood severe service. Maintenance cost has not been prohibitive and we consider the results satisfactory." In this mine, men walk to their working places and ride out on the belt.

"After studying all the facts and circumstances concerning a negative trolley installation, it was clearly indicated that the negative trolley should be changed."

Short Creek mine, opened in 1942 and Concord mine, opened in 1946, will shortly be changed from negative to positive trolley, said H. B. Buckingham, electrical engineer, Tennessee Coal & Iron Div., United States Steel Corp., Fairfield, Ala. Deterioration of the insulators, and of the mine roof around the insulators, became so bad that in June, 1952, the company's electrical laboratory was asked to make corrosion tests. In washing a 14-in length of corroded hanger pipe an explosion occurred in the pipe. Analysis showed metallic sodium, which reacts violently with water. Since percentages of caustic soda and sodium carbonate were found in all Short Creek and Concord hanger deposits, the sodium hazard was a factor in the decision to change to positive trolley polarity.

The older-type rectifiers, which were the reason for reversed polarity in the two mines, are to be revised in a number of ways. They number 13. Only minor changes will be necessary in five newer units because they were built for either polarity. Mr. Buckingham said that Bureau of Mines information shows 96 mines with negative trolley, as follows: West Virginia, 57; Virginia, 8; Ohio, 8; Kentucky, 7; Alabama, 2; and Illinois, 1.

In further discussion of reversed polarity, E. L. Parker, Mining Section, Westinghouse Electric Corp., went into the theory of electrolysis and explained the inherent characteristic of rectifiers which made reversed polarity the easy way. He also explained the changes required to insulate the cooling system and the revisions in electrical connections necessary to convert to positive trolley polarity.

Agreement with the following recommendations of the National Association of Corrosion Engineers, which were amended and endorsed by the Under-Ground Power Committee of the American Mining Congress, was indicated by Mr. Parker:

NACE—Negative grounding of DC traction power supply equipment, including rectifiers, is preferable from the standpoint of the effects of stray-current electrolysis on underground structures in the mine, and on other structures in the vicinity, such as, pipe lines, cables, etc.

New installations of DC power-supply equipment should be grounded on the negative side.

Every consideration should be given to converting existing positive-grounded systems to negative.

AMC—In converting existing electrical equipment, particularly old-style rectifiers, from grounded positive to grounded negative, the electrical manufacturers should be consulted for their comments and recommendations for the best procedure to be followed.

Getting Results in Preparation

"Careful analysis of all factors should be made individually before resolving the problems of preparation today and in the future."

Four major mine-operating practices affect the operation and efficiency of a coal-cleaning plant, said R. L. Llewellyn, preparation engineer, Eastern Gas & Fuel Associates. These four factors are run-of-mine crushing, raw-coal storage, continuous mining and three-shift operation.

When crushing run-of-mine coal—or, better expressed, coal produced by full-seam mining—without handpicking, slight contamination of the ⅛ x 0 size occurs and washer rejects increase from 14 to 22%, Mr. Llewellyn reported. Large, flat pieces of slate in the washer feed also cause trouble in the reject mechanism and the elevators. Even so, plant adjustments can be made to offset these troubles and handpicking can be eliminated. When rejects are hard and the coal is soft, a rotary crusher works satisfactorily. Also, single- and double-roll crushers have been developed to handle coal produced in full-seam mining. In seeking to crush everything that comes out of the mine, however, operators should avoid underpowered units and, in fact, might well provide extra safeguards by using motors one size larger than recommended by the manufacturer.

As for storage of raw coal ahead of the preparation plant, Mr. Llewellyn urged the use of spiral chutes to avoid degradation and low-level indicators to avoid running the bin empty. To avoid segregation, he suggested partitions inside the bin or layer feeding from a distributor conveyor. For overall effective operation of the bin, he urged that it never be run empty or over-full and that a dust-collection system be installed.

Continuous-mining machines, with one possible exception, produce less plus 5-in coal than conventional loading machines, Mr. Llewellyn said. However, this may be advantageous in that the continuous-mined coal may be an acceptable top size for plant feed. But spraying at the face and the increase in percentage of fines associated with continuous mining may slow down fine-coal screening; cause trouble in settling tanks, sludge-handling units and media recovery; and boost the quantity of impurities in fines.

Three-shift operation of cleaning plants offers the advantage of maximum production with minimum capital expenditure but it may not always be most economical, Mr. Llewellyn explained. If three-shift production is planned, however, it should be planned from the design stage of plant construction and should include provision for down time, preventive maintenance, skilled operators, adequate inventory of spare parts, standby units and heavier-than-usual conveyors, chutes, screens and pipes.

Speaking on the same subject as Mr. Llewellyn, Clayton F. Slack, preparation engineer, Sahara Coal Co., Inc., made the following comments:

Continuous mining—Since continuous mining reduces the size consist of run-of-mine coal, fine-coal preparation equipment must be enlarged or the plant capacity reduced. Difficulty in keeping the mining machine in the coal may result in additional contamination of the fines.

Raw-coal crushing—Crushing run-of-mine coal before feeding it to the plant will reduce chute clogging, belt spillage and wear and tear on equipment. In using single- or double-roll crushers, undersize probably should be screened from the crusher feed. Feed to pick breakers usually should be prescreened and picked. Rotary breakers, used where the coal is soft and the reject hard, eliminate hand-picking but increase washer refuse.

Raw-coal storage—Storage makes possible continuous and uniform plant feed, especially where a central plant serves several mines, and is a major step toward higher cleaning efficiency, better oil treatment and consistency in blending. Silos, unlike surface stockpiles, keep segregation at minimum, especially if run-of-mine is crushed before storing. Lowering devices, such as spirals, reduce breakage in silo and hopper storage. In strip mines, where local irregularities in the coal cause extremes in plant feed, raw-coal blending facilities are helpful in evening out the irregularities.

Three-shift operation—Before deciding on three-shift operation of the plant, a company should provide for maintenance and standby equipment, though standby equipment may run total capital investment up. Standardization of parts may be the answer to maintenance.

"Recovery of fines has increased the dollar recovery per ton of raw-coal feed to the preparation plant."

"Several modern plants now are recovering anthracite as fine as 200-mesh," said William T. Turrall, supervisor of preparation, Lehigh Navigation Coal Co., Inc. Among these plants is the new fine-coal installation at Coaldale, which went into operation in December, 1951. Feed to the fine-coal plant comes from the main plant and amounts to about 9,000 gpm containing about 350 tph of minus $\frac{3}{32}$-in material. Solids in the feed run about 15%; ash content, 25% or higher.

This slurry is pre-classified in a 24-ft-diameter hydroseparator, which removes some 66% of the water and about 33% of the weight of the solids, all of which is flotation size or smaller. Hydroseparator underflow, containing No. 4 and No. 5 buckwheat, is pumped at 3,500 gpm to a 50-ft elevation to provide gravity flow for the remainder of the process. Two launder screens remove the oversize from the pulp, three screens remove the No. 4 buckwheat and an additional three screens remove the fines from the No. 5 buckwheat. The launder screen, Mr. Turrall noted, is rapidly becoming the universal screen for sizing large tonnages of fine anthracite and holds promise of being used successfully on coarser sizes.

Since the action on a launder screen necessitates a certain quantity of water overflowing the discharge end of the screen, this water, together with fines, must be removed for operation of the 6-ft Wilmot Hydrotators used in cleaning the No. 4 buckwheat. The conventional tank classifier with dragline has been replaced with a 60-in triple-pitch Wemco spiral classifier, which dewaters to 38% moisture at 85 tph.

The 400-gpm overflow containing 85% solids is in closed circuit with the 24-ft hydroseparator and removes 9 tph, 87% of which is minus 20-mesh. At the discharge end of the No. 5 launder screens, excess flooding action is provided to supply make-up water for the 16-ft Wilmot Hydrotator and to supply a constant addition of fines to maintain the gravity required in this machine. Undersize from the No. 5 screen makes up part of the feed to the flotation section of the plant. Standard Wilmot equipment is used to clean No. 4 and No. 5 buckwheat.

A 45-ft Dorr hydroseparator thickens the flotation feed (overflow from the 24-ft hydroseparator plus fines from the No. 4 and No. 5 cleaning equipment) and removes roughly 145 tph of minus 200-mesh material. Underflow at 35% solids is pumped at 600 gpm into an 8-ft classifying conditioner designed by Mr. Turrall and built by Denver Equipment Co. This conditioner, a concentrating device that removes about 10% of the feed to the cells, sends pyrite and high-ash particles (about 70% ash) to refuse. The conditioner eliminates sanding in the cells, stretches the life of impellers, permits better distribution of air in the cells, and maintains a uniform float condition.

The flotation circuit comprises two banks of six No. 30 Denver Sub-A cells. Feed enters the No. 2 cells at 20% solids and products from Cells Nos. 2 to 5 are finished products. Cells No. 6 are scavengers, returning froth to Cells No. 1

for cleaning. Reagents are Yarmor F pine oil and No. 2 fuel oil. The cells treat about 60 tph of material containing 23 to 30% ash. Finished product averages 13 to 14% ash. Flotation froth is dewatered by cyclones and Robins Dewaterizer screens. Overflow from the 45-ft hydroseparator is treated in a 180-ft-diameter Dorr thickener. Settled solids go to an impounding pond. Thickener overflow at 5,000 gpm is recirculated to the breaker, the excess being allowed to flow into Panther Creek, since it is within the allowable limits of the Pennsylvania anti-stream-pollution laws.

The Coaldale plant operates at 87.5 to 98% efficiency, shipping No. 4 buckwheat and No. 5 blend, which is made up of No. 5 buckwheat and flotation products, Mr. Turrall said.

Since about 20% of total clean coal produced by No. 27 preparation plant, Island Creek Coal Co., was ¼ x 0-in, the company sought a way to prepare a fine-coal product comparable in quality to other processed coals, said Matthew Turkovich, director of preparation. A wet system was chosen because it produces a uniformly low-ash, low-moisture coal and provides a way to salvage slurry and reduce stream pollution. In addition, it increases coal recovery. With a total raw-coal feed of 63 tph of mine-run slack and 3 to 5 tph of slurry, the plant now recovers about 90% of the raw feed —a product averaging about 4.75% ash and 2.85% surface moisture. Waste water, at pH 7.8, is discharged to a nearby stream.

The plant comprises a Wilmot Hydrotator and classifier. Part of the minus 28-mesh overflow from the classifier is processed by froth flotation through a six-cell Denver Sub-A unit. Plus 28-mesh product from the Hydrotator and classifier is filtered through two C.M.I. units of 45-tph capacity. Minus 28-mesh is filtered in two 6-ft 6-disk Denver vacuum filters. The combined filtered products then are thermally dried by a Raymond flash drier.

Maintenance cost at the No. 27 plant has been about equal to the average for Island Creek's seven large plants. Some measure of the company's satisfaction with the No. 27 plant is indicated in the recent installation of a similar plant at Mine No. 25, Mr. Turkovich concluded.

Cleaning of 250 to 300 tph of raw minus ¾-in coal at the Georgetown plant, Hanna Coal Co. Div., Pittsburgh Consolidation Coal Co., was described by Wendell E. Bearce, of Hanna's executive department. Primary separation of the fines is made on a pair of double-deck screens flooded with 2,500 gpm of circulated water and sprayed with 400 gpm of clear water. Following screening, the product goes by gravity through a splitter to six drag conveyors in the raw-coal tank. Minus 100-mesh overflows with the water. The settled material is sluiced from the discharge of the conveyors to distributors, which divide it among 31 SuperDuty Diagonal-Deck tables.

Table refuse is collected on belts, which dewater it and discharge it to the main refuse belt. The table product is sluiced to the clean-coal tank beneath the table floor. Six drag conveyors dewater the clean coal at about 25% moisture and deliver it to six Reineveld centrifugal driers, which reduce moisture to 8 or 9%. This product is further dried to 4½ or 5% moisture in Raymond flash driers, supplemented by Pease-Anthony scrubbers to collect the fine dust that escapes the dry cyclone collectors.

The entire plant is run in closed circuit with a settling pond, Mr. Bearce explained. Plant effluent, made up of discharge from the raw-coal tank, the jig circuit, the cone sand sump silt cocks, and the scrubbers averages about 3,500 gpm at 5% solids. Settled material is removed from the pond by a dredge and pumped to a much larger settling area at greater elevation, so that clear water is returned by gravity. The pump is mounted on a barge equipped with a steel suction pipe and a cutter head that rotates at 85 rpm to stir up the solids and put them in suspension. An instrument has been developed to record continuously the percent of solids the pump is handling. Overflow from the settling pond to the stream system averages about 43 parts per million of solids and a pH of 7.62.

How heavy-media coal preparation has improved the company's products and added to its list of satisfied customers was told by J. B. Taggart, vice president, Wise Coal & Coke Co. The changeover to careful cleaning was spurred by drilling surveys that indicated considerable variation in seam conditions in the future, and a need for full-seam mining to cut costs.

The company aimed at a maximum of 5% ash in all products. Drill cores indicated that a relatively high gravity separation would produce an acceptable ¼ x 0-in coal. In the larger sizes, a separation at 1.60 from certain sections of the property would produce a coal comparable to the 1.40-separation coal from other sections.

To reach the goal of 5% ash, therefore, separation would have to be made at 1.40, thus rejecting a good deal of near-gravity coal which would be well worth recovering. The solution was installation of a two-compartment Wemco drum separator, with higher-gravity separation (1.40 to 1.60) being made in the second compartment. Float material in the second compartment goes through a pulverizer and thence to tables.

The two-compartment drum turns out three products in one pass, Mr. Taggart explained. Pre-sized and pre-wetted run-of-mine coal is fed from launders into the first or low-gravity compartment. Float continuously passes from this first compartment by overflowing a circular weir located at the feed end of the drum. Sink material in the first compartment, containing both middlings and refuse, is elevated by lifters attached to the inside periphery of the rotating drum and is discharged through an internal chute into the high-gravity compartment. There, middling coal is the float product and refuse is the sink material. Float material overflows through a circular weir at the discharge end of the drum and the sink, caught up by lifters, is discharged by a chute to the drain screen.

Media reclamation is accomplished by a single circuit. The media-screen drainage sump is divided into two compartments, each having a separate pump for returning media to the respective compartments of the drum. Cleaned media from the 36-in densifier is split into two portions, each portion being returned into one of the two pump sumps. The media-washing sump is a common sump. All diluted media passes to the magnetic separator and densifier circuits for cleaning and re-use. Magnetite consumption averages 0.69 lb per ton of cleaned coal.

Better Overburden Drilling

"Drilling has become a serious and costly operation, requiring complicated drilling equipment with expensive initial and maintenance cost."

In strip-mine drilling, the hardest formations to penetrate are, in descending order of difficulty, sandstone, niggerheads, mud and limestone, said Fred Horne, chief blasting engineer, Sinclair Coal Co.

Recently at the Homestead Coal Co., near Earlington, Ky., a special 9-in drill head developed by the Austin Powder Co. has been substituted for a conventional molesfoot head on a vertical drill, Mr. Horne reported. In November, 1952, the new head drilled 167 holes with a total of 7,895 ft against 113 holes and 5,010 ft for a molesfoot head on a similar machine. Overall time savings with the new head were 8 hr 15 min. Cost per foot for the new head was 12.25c against 19.26c for the molesfoot. Both heads were used in sandstone.

Elsewhere, at the Sunlight Coal Co., Boonville, Ind., niggerheads make drilling difficult, Mr. Horne said. OWC bits are used with a vertical drill. Where the ratio of shale and limestone to slate and niggerheads is very high, bits may last up to 10,000 ft, but where the percentage of niggerheads is high, bits often wear out after two or three shifts. Dry, stiff mud also complicates drilling, since it fouls the auger flights and uncouples auger sections. There is a real challenge to builders of dry rotary drills to design a horizontal drill for limestone that cannot be drilled horizontally with existing equipment.

A new-type drill is in use at the Seminole Coal Corp., New Athens, Ill., Mr. Horne said. There where overburden includes a thin stratum of limestone, vertical drilling produces no displacement though fragmentation may be fairly good. The new drill, of horizontal design, has a drill bridge that is movable vertically, so that it can be lowered to the coal. This drill replaces vertical drills formerly used, with the result that expensive casing of vertical holes and churn-drilling

of the limestone have been averted. Now, two shifts of two drillers and two shooters each, working five or six days a week, can easily stay ahead of the shovel, compared with 13 drillers and shooters working three shifts seven days a week with the vertical drills. At the Broken Aro mine, Wellston, Ohio, massive limestone boulders separated by mud slips lie above the coal. Vertical drilling is almost out of the question. The drill now used at Broken Aro is modeled after the one at Seminole but much heavier and more rugged (see this issue of *Coal Age*, p. 78).

Horizontal drilling at Ayrshire No. 2 mine, near Winslow, Ind., is done by a Sullivan No. 30 Stripborer, said Marlin Carter, superintendent of drilling and blasting, Ayrshire Collieries Co. A drill crew consists of two men, with average footage of 300 to 350 ft in a 6¾-hr shift. Overburden includes topsoil, red sandstone, gray shale, rider coal, gray shale streaked with white sandstone, limestone, cap rock and black slate. Drilling is done horizontally, with a single row of holes in banks less than 50 ft high, and with high and low holes in higher banks.

The company's experience indicates several economic advantages for horizontal drilling: (1) twice as many vertical holes are needed to uncover the same area of coal; (2) with equipment traveling on top of the coal, tramming conditions are better with horizontal drilling; and (3) bad weather, especially in winter and spring, does not hamper horizontal drilling as it does vertical drilling. Briefly reviewing practices at a few other mines belonging to his company, Mr. Carter concluded that any strip operator should select the type of drill best suited to the conditions in and around his own mine.

With overburden consisting of clay topsoil, decomposed gray shale, hard sandy shale and dark blue shale, four Model 103 McCarthy self-propelled horizontal drills, two driven electrically and two by diesel engines, are used at the Ozark-Philpott mine in Johnson County, Ark., to strip metallurgical coal, said Merle H. Busby, general superintendent of the operation. Overburden ranges from 20 up to 50 ft. Holes are drilled to a depth of 60 ft. With vertical drills on an experimental basis, drilling costs ran as high as 0.70c per foot because of the hardness of sandrock lying above the coal. Horizontal drilling has cut this cost greatly.

Using Hercules Type 100 sintered-carbide-tipped bits with a No. 650 Salem cutting head for overburden up to 35 ft, and a No. 346-D Coalmaster cutting head for 35 to 50 ft of overburden, drilling costs average 0.14c per lineal foot. Overall drilling costs per foot of overburden handled run to 0.01c per cubic yard; overall loading and shooting costs, 0.05c. Cost of drilling and shooting, including depreciation and overhead, comes to $1.35 per ton of coal loaded. The company realizes 17 yd of material per lineal foot of drilling and averages 3½ yd per pound of powder used.

Turning to vertical drilling, Robert L. Akre, superintendent of drilling and blasting, The Maumee Collieries Co., pointed to the need for thorough fragmentation of overburden when large draglines are used. Realizing the need for large-diameter vertical holes, up to 10 in and more, Maumee turned to Bucyrus-Erie with a request for a vertical-type roller-cone compressed-air machine capable of drilling holes up to 12 in.

The first machine was delivered in September, 1952 (*Coal Age*, March, 1953, p. 80). It has exceeded expectations in some respects. Citing limitations of the drill, Mr. Akre mentioned the following: (1) high cost of the machine, running to four times as much as that of a 10-in churn drill; (2) great weight; (3) slightly higher power consumption; (4) bit cost of 4c per foot of hole, compared with 1c for a churn drill; and (5) extensive training required for operators. These limitations, however, are offset by operating results as follows:

1. Better fragmentation and absence of mud and water in the pit.
2. High rate of drilling—up to 2,176 ft on two 6¾-hr shifts with three men on each shift.
3. Cubic yards prepared per man-shift —around 10,000, compared to about 2,500 for a 10-in churn drill.
4. Drilling cost per foot of hole—about 9c, against some 16c for 6-in horizontal drills and almost 40c for 10-in churn drills.
5. Cuttings that provide perfect stemming.

Maumee expects to go to 12-in holes soon and is exploring the possibility of using even bulkier explosives with slower detonation rates than the currently used ammonia-type explosives. With three Bucyrus-Erie drills in operation (two now are on order to supplement the original machine), eight 42-T drills and two horizontal drills will be replaced, with labor savings of some 75%, Mr. Akre said.

The return of strip operators to vertical drilling results from the disappearance of shallow stripping reserves and the development of mines with thick rock strata high in the banks, so that horizontal holes cannot produce proper bank preparation, said G. H. Utterback, chief engineer, United Electric Coal Cos. Though vertical drilling may not lower costs, it does break the rock so that coal can be loaded without tearing up costly stripping shovels and draglines.

Latest development to make vertical drilling more useful is the emergence of the drill using the roller bit with compressed-air flotation. One refinement recently added to this type of drill because of water in the hole and the caving of topsoil into the hole is substitution of an auger for air flotation. The auger keeps the hole open. Auger-changing time, the curse of auger drilling, has been reduced by placing a hoist sheave on top of the mast, some 91 ft above the ground, enabling the machine to drill a 73-ft hole without addition or removal of auger sections. The auger section is held in line by two floating guides to prevent deflection. Drilling rates run 3½ to 5 fpm in clay, 1½ to 2 fpm in rock and 4 to 5 fpm in shale and slate.

In discussion following presentation of the papers, Mr. Akre was asked whether he expected the Bucyrus-Erie drill to cut a 12-in hole as fast as a 10-in hole. He answered that he does expect to by increasing the pressure, which may go as high as 5,000 lb. As for the life of bits, he said that first runs produced only 3,800 ft per bit but that bits now are producing up to 5,000 ft. A change in the placement of air jets in the drill head may run this figure up to 8,000 ft. Bits, he explained, are worn out not by going down, but by going around and around; hence more pressure will give more depth and less wear.

Upping Truck and Shovel Rates

Haulage of coal and overburden and trends in dipper and bucket design were the themes of two panels at the Tuesday afternoon session on stripping. Introduced by Hugh B. Lee, president, Maumee Collieries Co., the panels comprised the following:

Haulage—F. W. Chesney, president, Shen-Penn Production Co., panel chairman; R. C. Gessel, field engineer, R. G. LeTourneau, Inc.; E. E. Howard, special representative, Caterpillar Tractor Co.; A. S. McClimon, manager, sales development, Euclid Road Machinery Co.; and Ralph H. Kress, executive vice president, Dart Truck Co.

Buckets and Dippers — James D. Reilly, vice president, Hanna Coal Co. Div., Pittsburgh Consolidation Coal Co., panel chairman; A. F. Busick, vice president, Marion Power Shovel Co.; R. M. Dickey, sales manager, large machines, Bucyrus-Erie Co.; P. V. Larsen, chief engineer, Construction Equipment Div., Electric Steel Foundry Co.; C. J. Polinek, assistant to the president, Page Engineering Co., and Karl Schneider, design engineer, Harnischfeger Corp.

"The past 15 yr has seen greater advancement in the stripping industry than ever before."

Since haulage must represent the greatest element in stripping cost, the greatest opportunities for cost-cutting rest in haulage, Mr. Chesney said. Modern haulage units are characterized by capacities up to 60 tons, engines powerful enough to operate on 8% grades, speeds up to 35 mph, torque converters and automatic transmissions, spring mounting, power steering and driver comfort.

With the trend pointing toward larger units for hauling rock and overburden, Mr. Chesney urged manufacturers to direct their energies toward increased payload in relation to gross weight, greater flexibility in tight quarters, further im-

provement in quality of parts, and better availability of parts. Likewise, he urged stripping operators to consider shortening, straightening and grading haulage roads and pit roads, using the best road materials and drainage possible, and planning additional areas to strip at increasingly higher ratios.

The question as to how large the open-pit operator wants his equipment to be is far from settled, Mr. Gessel reported. It is not always true that larger haulage units reduce the cost of haulage, since other factors enter into consideration. Even so, with the opportunity for new, specialized design afforded by off-highway haulage, circumstances favor further improvements in truck haulage.

The growing size of loading-shovel dippers to speed loading of high-capacity trucks creates the problem of providing a hauling unit strong enough to absorb loading shocks, yet low in cost. Listing some possibilities for future development, some of which already are under way, Mr. Gessel pointed to all-wheel drive, electric drive, reduction in number of components, simplification of lubrication, twin-engine power plants, torque converters and automatic transmissions, power steering and gear shifting, larger but lower-pressure tires, and an increase in the number of wheels. "The future will show a shift to 35- and 50-ton units. The 100-ton units of the future will have to await new engines, tires and transmissions," Mr. Gessel concluded.

Earthmoving equipment fits into three general work zones, Mr. Howard said. These three zones are: (1) the power zone, up to 300 ft of distance, where high speed is not needed but maximum traction, maneuverability and power are prime factors; (2) the short-haul zone, up to 1,500 ft; and the high-speed zone, where long hauls put a premium on speed. In Zone I, the track-mounted tractor with dozer blade is almost universally used. In Zone II, the tractor-drawn scraper with struck capacity of 15 to 20 yd capacity is especially useful where there is not enough room for boom operation—near highways, railroads, power lines and pipelines, for example. In Zone III, high-speed, wheel-type, rubber-tired units, with scrapers or wagons, provide economical service. For these last, roads must be good and grades kept at a minimum. Depending upon application need and operating zone, earthmoving equipment of various types is finding increased use in coal haulage, spoil haulage, land reclamation, culm-bank reclamation and overburden removal, Mr. Howard said.

Speaking of hauling rock and overburden in the anthracite region, Mr. Kress reported that torque converters have made it possible for loaded trucks to climb steep grades, thus shortening haulage routes. A 48-ton truck with torque converter now hauls coal at 30% less cost per ton-mile than a 37-ton truck with standard transmission running on the same route and road.

Mr. Kress also stated that larger trucks are time- and labor-savers and do not create traffic problems in the pit. He urged truck operators to set up systematic maintenance programs for their trucks and suggested that big trucks be equipped with primary and secondary springs under truck and trailer. The primary springs will ensure a smooth ride when the truck returns empty and, in the pit, will absorb the shock of loading. The secondary springs will help carry the load when running loaded to the tipple. "Our company," he said, "is very enthusiastic about the possibility of a 100-ton truck for hauling coal."

"Are we, the coal stripper and the truck manufacturer, doing as good as we have to do," Mr. McClimon asked. Seeking the answer to his question, he cited haulage costs as reported to his company by operations producing close to 25,000,000 tons of coal and operating 103 haulage trucks. Varying methods of accounting, however, make interpretation of these cost data difficult and Mr. McClimon drew only general conclusions, though he cited a wide range of figures, from 7.3 up to 21.2c per ton-mile for trucks hauling 20 to 25 tons, and from 6.6 up to 21.7c for 32- to 40-ton trucks.

Concluding, Mr. McClimon contended: (1) larger capacity does not automatically produce lower haulage costs; (2) the haulage unit must be carefully fitted to individual mine needs, including length of haul, pit space, size of loading shovel and balance with other units; and (3) we are approaching the economic limit on size of haulage units under present conditions. A close working relationship between mine operator and truck manufacturer is needed "to make the industry be as good as it has to be," he said.

"Development and design of dippers and dragline buckets is a highly specialized technique."

Study, engineering talent and imagination have produced metals and techniques for dipper and bucket design that have created steadily improving efficiency in shovels and draglines, Mr. Reilly said in opening the panel on trends in buckets and dippers. He cited several pieces of pit excavating equipment operated by his company as examples of extended life and higher capacity growing out of metallurgy and engineering applications. At the same time, he explained, many of the improvements should be credited to better fragmentation of overburden and better maintenance methods. For instance, he pointed out that maintenance men at Hanna properties have cut dipper-changing time from 14 hr to 5; crawler-changing time from 8 hr to 2; boom-cable changes from 16 hr to 5. In short, he concluded, efficiency boosts come from the organization and teamwork of all groups in the company.

Since 1950, U. S. Steel Co.'s "T" steel, an improved alloy plate with high impact strength at low temperatures and with only a nominal amount of preheat required for welding, has been standard for Marion dipper lips, Mr. Busick said. Tracing other recent developments in dipper design, he cited the rounded front with curved lip for use on big shovels, butt-welding the tooth bases to the leading edge of the lip instead of overlapping it (thus, if failure occurs, the base may break off without damage to the lip), and the use of cast manganese fronts and modified armor-plate backs, doors and bails for handling highly abrasive materials.

Speaking of shovel and dragline maintenance, Mr. Dickey pointed out that dipper and bucket sizes and operating ranges for individual machines are established by manufacturers on the basis of their accumulated experience and knowledge, and that exceeding these ranges subjects the machines to stresses that cause fatigue and ultimate failure—or at least unexpectedly high maintenance costs. Of the two ways to decrease bucket or dipper weight—by using less of the standard materials or by going over to lighter but equally strong or stronger metals—Mr. Dickey urged the second method. He pointed out, for example, that using Jessop steel in both dipper and handle, his company has increased dipper size on one shovel 17.6%, and that plans now are under way for raising the percentage to 41.2%.

Recent advances in bucket and dipper design, according to Mr. Larsen, include the following: the all-manganese steel dipper; the combination cast-and-fabricated dipper which, being lighter in weight, handles extra yardage; the all-cast dipper, with its lower maintenance cost; and elimination of dead weight by use of new, more suitable metals.

The dragline bucket has undergone many of the improvements shovel dippers have undergone, plus several advances applicable especially to dragline needs. Thus the modern bucket has a much wider lip, a shorter basket and a higher arch than its predecessors and moves more yards of material more efficiently. Likewise, the coal-loading dipper of today shows improvements growing out of metallurgy and design and now weighs from 18 to 35% less than older all-cast dippers of the same capacity. Snubbers are effective on large dippers but usually are not required on smaller ones. The fact is, dipper-door and hinge designs need improvement for more efficient operation without snubbers, Mr. Larsen said. Other improvements needed are: (1) redesign of stick handles to allow clearance for door swing and retarding; (2) further reduction of dead weight by use of new shock-absorbing materials; and (3) standardization of back connections and stick design.

Mr. Polinek listed the following requirements in a good dragline bucket: (1) must start digging the moment it is pulled forward by the load line; (2) must load itself within one, two or three lengths of the bucket itself; (3) must continue its bite without going deeper until fully loaded; (4) must pass material into the bucket rather than push it ahead; (5) must be balanced so that the material being loaded will fill the bucket; (6) must start toward the surface when fully loaded, thus consuming less power; and (7) must carry its load without dribbling and dump promptly without striking the arch. He also offered some suggestions

for good dragline operation, as follows:

1. Dig directly under the boom point.
2. Avoid excessive dragging of the bucket.
3. Lower bucket with all lines taut.
4. Keep the bucket clean.
5. Observe manufacturer's recommendations on loading.
6. Keep the teeth sharp and built up to proper size.
7. Work with the boom at its lowest efficient angle.
8. Take an even cut and fill the bucket.
9. Use the proper length of dump cable.
10. Avoid piling dirt under the boom foot.

To use fully the increased power and speed of modern shovel machinery, a good dipper must fulfill four conditions, Mr. Schneider pointed out. These conditions are: (1) ability to enter the bank with minimum wasted effort; (2) ability to fill quickly; (3) ability to dump fast and clean; and (4) ability to withstand severe punishment with minimum time out for repairs. Improvements have been made in the dipper front (higher, with teeth set out at better angles, and with the front joined to the dipper body by an ingenious "S" line joint); in the dipper body (addition of vertical box sections to the usual top and bottom box sections, plus stiffening ribs); in the dipper door (use of heavy rubber bushings at the pin joints to absorb shock loads and addition of snubbers for dipper doors); and in maintenance and replacement parts. These improvements are only the beginning, Mr. Schneider stated, and he urged operators, manufacturers and design engineers to continue working together for more advances.

Making Coal Mining Safer

"It appears to be feasible to apply systematic gas drainage to the immediate area of these tests."

In other countries of the world, methane has been recovered from coal seams to supplement fuel supplies but in the United States the aim has been safety, said Prof. G. R. Spindler, director, School of Mines, West Virginia University. Milton H. Fies, vice president, Alabama Power Co., presided at the session and stressed, in his opening remarks, the importance of finding the causes of mine accidents.

Reserves of methane in and above coal seams in this country are tremendous and, if recovered, might be of commercial significance, Prof. Spindler said. Tracing experimental drillings into strata overlying the Pittsburgh seam near Morgantown, W. Va., and into the seam itself, he reported that gas has been drawn in steady supply up to 500 Mcf daily over extended periods of time. He warned, however, that the same results might not be obtained elsewhere, since the permeability of coal beds varies widely and there are not yet any established bases for predicting flow. He stated also that much remains to be learned about the effects of local geologic conditions and desirable drilling patterns to obtain best gas-drainage results.

"Water is the best known suppressor of dust and should be applied as near the face as possible."

Reviewing advances in dust control in coal mines, James Westfield, chief, Health and Safety Div., U. S. Bureau of Mines, declared that water applied before dust becomes airborne is more effective than water used to disperse dust particles in the air. Purpose of dust suppression, he explained, is to prevent dust explosions and eliminate health hazards. Among practical suggestions offered by Mr. Westfield were the following:

1. Direct water streams at the ingoing and emerging bits of cutter bars.
2. When using a pipe on the end of a cutter bar, turn on the water a few seconds before the cutting begins, lest dust plug the pipe.
3. In top cutting and shearing, use shields to enclose the cuttings and conduct them to the floor, unaffected by the ventilating current.
4. In up-and-over continuous mining machines, it may be wise to supplement the spray nozzles provided by the manufacturer; in down-and-under machines, especially those with bits or augers rotating parallel to the face, though the dust problem is less serious, downward-directed sprays are helpful. The time may come when manufacturers will provide dust collectors integrated into continuous miners.
5. On loading machines, sprays are more effective if installed at the gathering end, rather than the discharge end.
6. On conveyor belts, sprays should be installed some distance back of the dumping point, say, 100 ft.
7. Wetting agents added to spray water improve dust-allaying efficiency.

"Rock bursts, when extensive, are serious catastrophes and if not controlled may force abandonment of the mine."

A cover thickness of 500 ft or more; a cover composed of strong members and having strong members lying close on the coal bed; and a floor that does not readily heave—these are conditions that appear to be necessary to a coal burst, said Charles T. Holland, head, Department of Mining Engineering, Virginia Polytechnic Institute. To take successful measures against rock bursts, Prof. Holland declared that the industry must find out more about: (1) the cause of excessive stresses, (2) the reaction of coal pillars to load, (3) the ability of rocks to store energy, and (4) the effects of mining methods. Even with incomplete knowledge of these factors, however, the following steps may help prevent bursts:

1. In complete-extraction operations, all the coal should be removed and the practice of leaving pillars, pillar remnants or sprags in the goaf should be abandoned.
2. Pillar lines should be oriented with the natural fracture system of the roof to promote caving in the goaf.
3. Development in the abutment areas of pillar lines or old goaves should be avoided.
4. Extraction should be planned to eliminate points formed by converging pillar lines or by pillar lines abutting on an old goaf.
5. Pillars should be recovered by open-end methods.
6. Pillars should be as large as practicable to provide strength for support.
7. Pillars should be uniform in size and shape.
8. Pillars should not be slabbed or split except on the goaf side.

Explaining that his remarks were directed only at room-and-pillar mining, Prof. Holland asked for more study and research, especially on stress distribution in coal beds and adjacent rocks and the effects of mining methods.

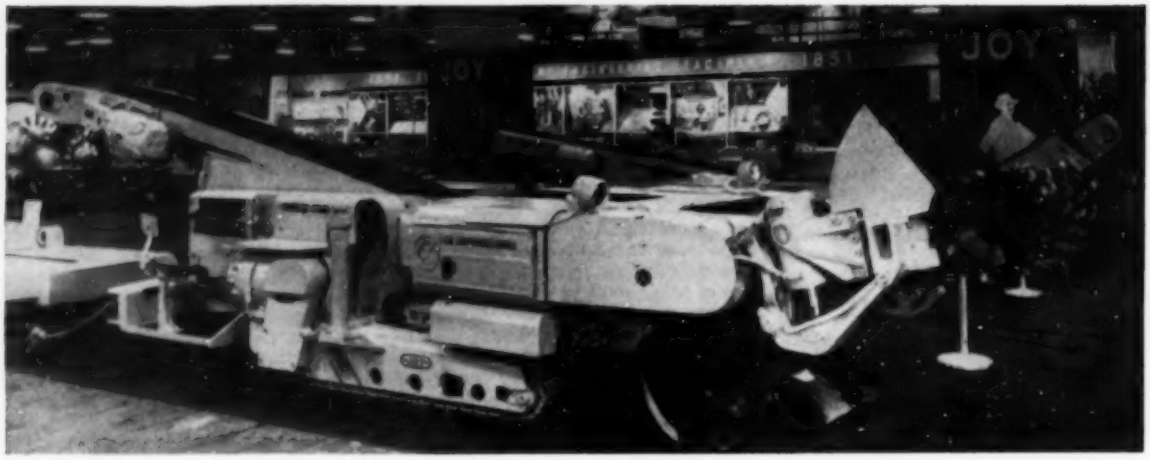
Two kinds of bumps, normal and violent, occur at operations of the Olga Coal Co., Coalwood, W. Va., said H. E. Mauck, general superintendent of the company. Normal bumps occur along pillar lines, he explained, and are an asset to mining operations. Usual practice is for a loading-machine operator to load the prepared cut of coal and then work around with the face until he gets a bump. He then retimbers the place and starts loading again.

But the dangers in violent bumps are serious, Mr. Mauck warned. His experience indicates that the following may be considered causes of violent bumps:

1. Oversized blocks adjacent to pillars.
2. Pillar work retreating from a barren or fault area.
3. Misalignment of pillars in which blocks of coal are left projecting into the caved area.
4. Slow extraction of pillars or the stopping of pillar lines.
5. Robbing an area that is insufficient in width to cause a major fall of the strata above the seam.
6. Failure to remove coal completely in pillar work. (Timbering and cribs in mined-out areas have the same effect.)
7. Heaving bottoms that come up and pack against the top.

The solution of the problem of coal bursts depends upon careful engineering, planning, observation and forethought applied from the time the mine is projected and sustained throughout development and retreat.

Please turn to p 146 for continuation of AMC Convention Report



Joy 1-CM continuous miner.

Equipment Show Sets New Record

With some 262 manufacturers exhibiting equipment and materials valued at $20,000,000, the equipment show at Cleveland set a new high in 1953. What was shown is the subject of the following report, based on a booth-by-booth survey by the Coal Age editors.

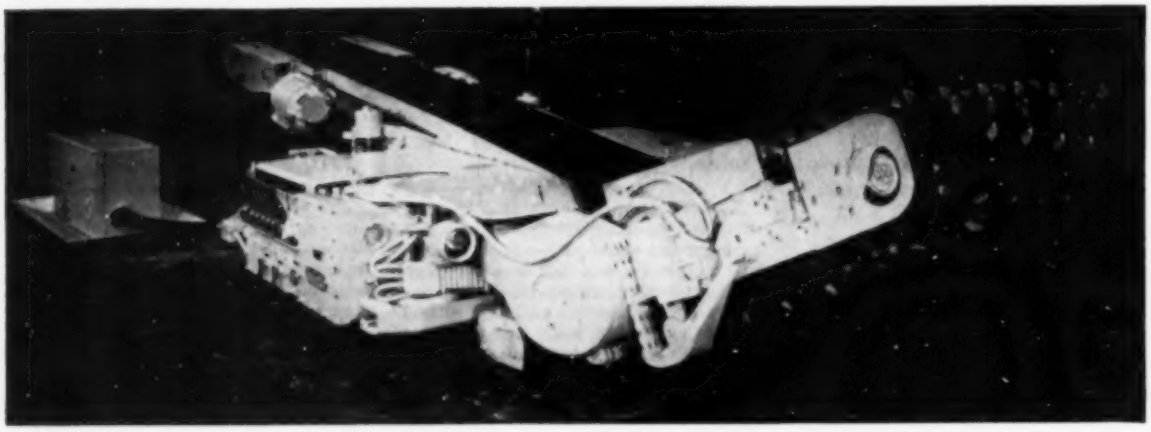
Mechanical Mining

Cardox Corp., Chicago 1—NEW high-capacity underground Augerminer powered by a 50-hp 230-v 1,800-rpm DC permissible Reliance motor started by 3-step mercury-timed permissible magnetic starter. Remote control of the unit is by a 3-unit rotary switch on the end of a 20-ft flexible cable. Main drive is through an 8-in multiple-disk wet clutch into a twin-disk marine gear with fluid coupling. Auger carriage travels 7 fpm when drilling and 50 fpm when retracting. Machine is available with or without crawler tracks that can be used either parallel or at right angles to the long axis of the auger. The unit is 34 in high without tracks, 39 in high with tracks, 103 in wide and 170 in long.

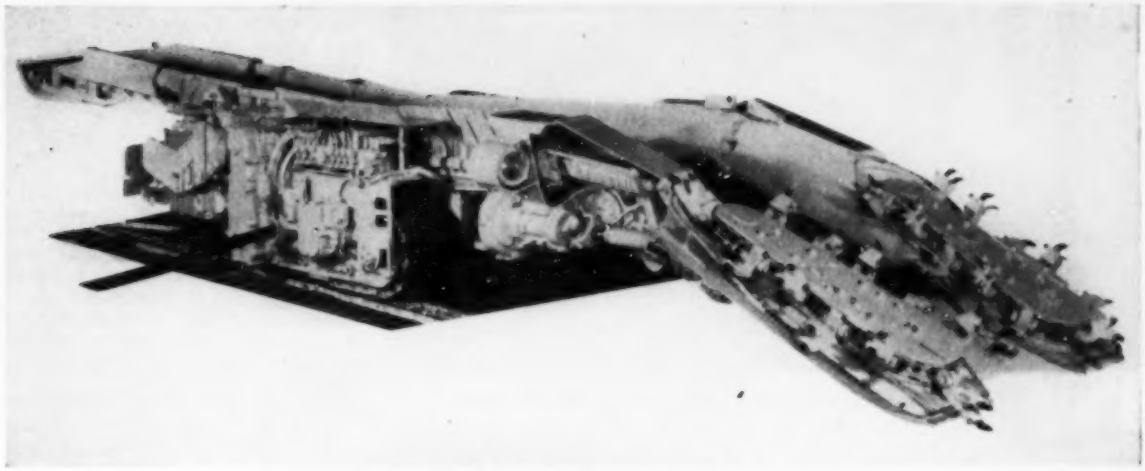
Clarkson Mfg. Co., Nashville, Ill.—Model 20FA low-vein rubber-tired loading machine, 30 in high, 72 in wide, 27 ft long; head may be raised or lowered, swung left and right; new-type digger chains; rear conveyor may be raised or lowered, swung left and right, equipped with universal conveyor mechanism.

Coal Mine Equipment Sales Co., Terre Haute, Ind.—Rebuilt loading machines.

Goodman Mfg. Co., Chicago 9—NEW Goodman Type 863B permissible tractor-tread Swing-motion loader, a high-capacity (8-tpm) unit particularly designed for trackless mining in low coal and discharge into low-vein shuttle cars, chain or shaker conveyors. With an over-all height of 26½ in and loading head 74 in wide, the loader features a 40-deg swing to either side of center line on both loading head and discharge end to provide a 14½-ft loading path with only forward and backward tramming, full loading of corners and tight spots and driving of 90-deg crosscuts in narrow



Joy 2-WM walking continuous miner.



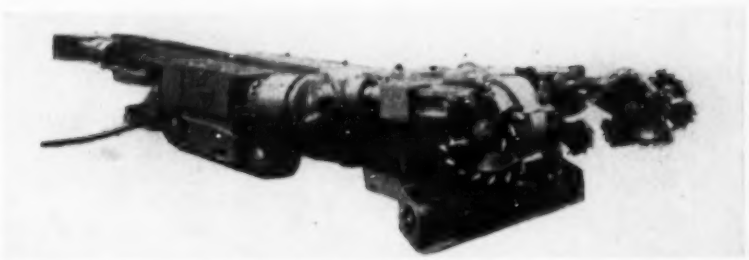
Goodman 666B permissible tractor-tread loader.

work by combining front and rear swings. Vertical lift of loading head from 12 in below mine bottom to 19 in above facilitates handling tight coal and rear end can be adjusted vertically to correct discharge height. NEW Goodman Type 666B permissible tractor-tread loader also shown features a swing-motion elevated chassis for road clearance and a straight rear conveyor with link-type suspension and a loading capacity of 8 to 10 tpm. The Goodman Type 2600 miner and Goodman-McKinlay miner were shown pictorially.

Jeffrey Mfg. Co., Columbus 16, Ohio—Type 76-A Colmol continuous-mining machine, with a basic mining height of 36 in adjustable up to 48 in and mining a 9½-ft face at capacities up to 3 tpm; Jeffrey Type 61-CLR conveyor-loader for operation up to 1½ tpm with discharge point pivotally anchored above room conveyor into which it discharges.

Joy Mfg. Co., Pittsburgh 22—Continuous miners, loading machines and coal-recovery auger, as follows: 3-JCM low-type continuous miner for 40-in seams and higher; 20-BU high-capacity loader for 30-in seams; 30-BU high-capacity loader for medium and high seams; AD2 auger drill for profitable recovery of coal where roof conditions prohibit room-and-pillar mining, together with assorted Core Bursters for coal seams with varying characteristics.

NEW 2-WM walking continuous miner for seams from 30 to 48 in, utilizes a 24-in-deep sump and 42-in-wide head to drive entries, mine rooms and extract pillars at a rate of about 2 tpm. The 2-WM is unaffected by slate bands, trams at 22 fpm and works rooms from 10 ft 8 in to 21 ft 4 in. NEW 1-CM high-type continuous miner for heavy duty service in 54-in seams or higher at 3 tpm, features a new roto gathering and cleanup device. It is adjustable to cut either up or down and will turn a 14-ft crosscut 90 deg from a 14-ft room. NEW Dosco Miner developed in Canada (*Coal Age*, October, 1951), is a longwall continuous-type unit with a cutting width of 4 ft 9 in, cutting height range

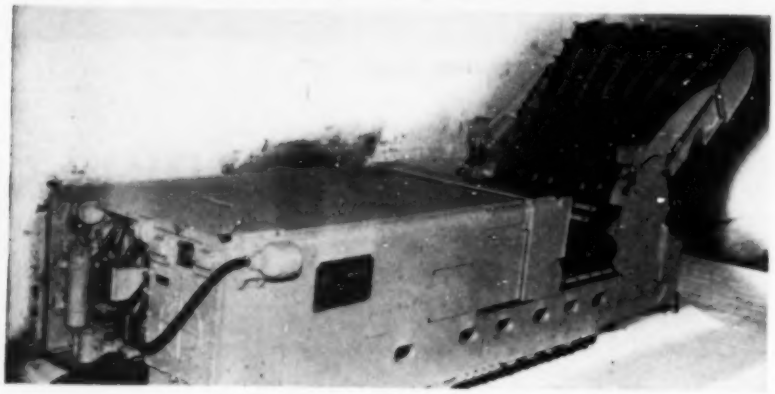


Lee-Norse Model CM-32 Junior Miner.

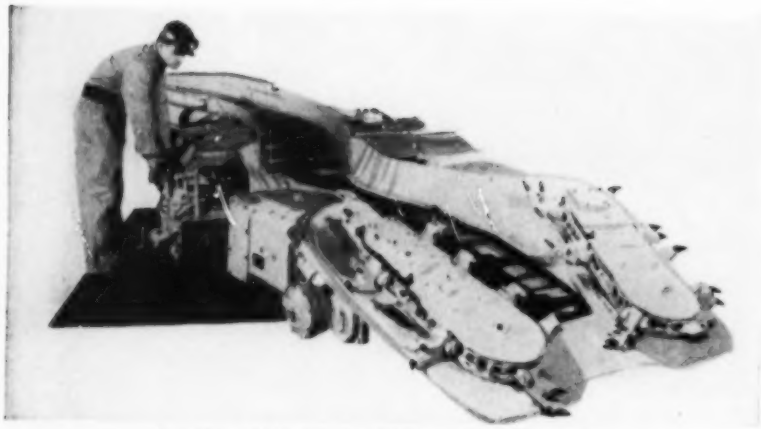
Cardox underground auger.

Joy Super 14-BU loader.

Mining Progress Loebbe-Hobel coal planer.



Dosco Miner.



Goodman 865B permissible tractor-tread loader.

from 4 ft to 7 ft 3 in and a capacity of 8 to 10 tpm. NEW Super 14-BU loader, a stronger, more powerful 1953 model of the 14-BU loader, features a 20% increase in loading capacity, faster tramming and conveyor-chain speeds. Rated at 6 to 8 tpm and maximum capacity of 10 tpm, the machine uses four 15-hp motors to power traction and gathering arms and has a conveyor-chain speed of 300 fpm, with heavy-duty electrical and mechanical parts utilized to add necessary strength to handle the increased power.

Lee-Norse Co., Charleroi, Pa.—NEW Junior Miner, Model CM-32, for continuous mining in low veins with an overall height of 32 in and a mining height of 54 in; and Lee-Norse Model CM-50 with a 51-in overall height and a maximum mining height of 9 ft. Features of both machines are "pattern cutting" with simplified rotary heads driven by fully-enclosed gearing in oil-tight housings, and electrical systems designed to operate from standard electrical installations found in the average mine.

LeRoi Co., Cleveland Rock Drill Div., Cleveland 11—Cleveland Rock Drill continuous miner.

Mining Progress, Inc., Highland Mills, N. Y.—NEW "Loebbe Hobel" German coal planer and panzer conveyor designed for continuous modified longwalling in low coal, and the Junior panzer conveyor.

Stripping

Aero Service Corp., Philadelphia—Information describing a NEW system of volumetric computation of coal and ore dumps by aerial surveys, along with Aero's regular services of providing aerial maps and photo-maps for use in estimating acreage, delineating crop lines, plotting overburden, inventorying timber, plotting property lines, planning rail spurs, and so on.

American Cyanamid Co., New York 20—American "Container-Cartridge" shipping and loading cartridge for strip mining.

Atlas Powder Co., Wilmington 99, Del.—Rockmaster blasting methods and equipment; basic principles of blasthole detonation, including the newly announced "Alternate Velocity Loading," a Rockmaster system of blasting using high- and low-velocity charges in the same shot for better, more uniform breakage. NEW Twinplex electric blasting-cap assembly featuring two duplex wires with two complete blasting caps encased in a plastic sheath offering more protection in rough or wet large holes.

Austin Powder Co., Cleveland 13—Drill tools and bits, including the improved-design A-P2 strip-head bit that has an added lip on top for more complete brazing of the carbide insert to provide added protection and longer service from carbide insert and minimize loss of inserts.

Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio—Lima shovels, cranes and draglines.

Bemis Bro. Bag Co., St. Louis 2—NEW strip-mine explosive bags for carbon black made from either sheeting or Osnaburg fabrics.

Bethlehem Steel Co., Bethlehem, Pa.—Hollow drill steel for overburden drilling.

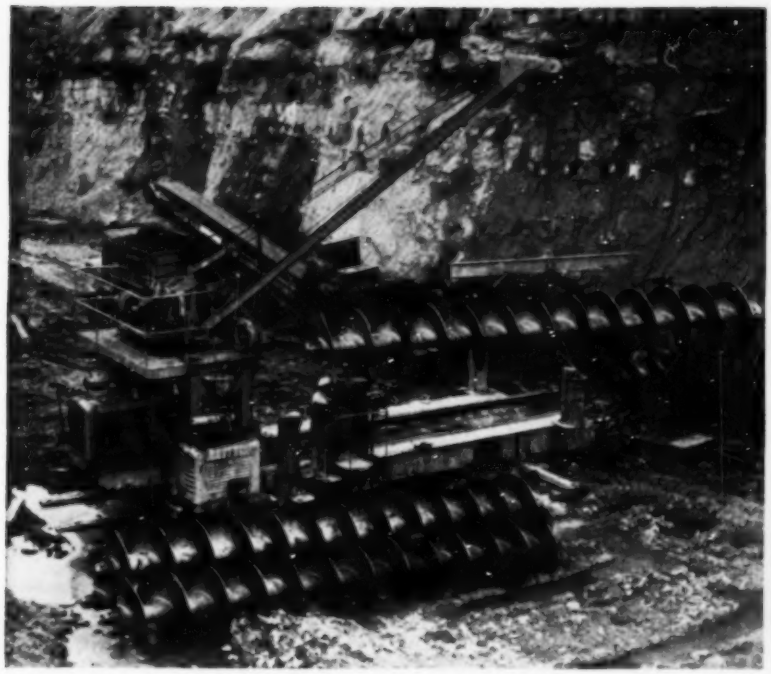
Bucyrus-Erie Co., S. Milwaukee, Wis.—Stripping shovels and draglines represented by an operating scale model of the 150-B; also loading shovels, blasthole drills and the Hydrocrane.

Cardox Corp., Chicago 1—145-hp surface Augerminer with augers up to 36 in; vertical drills and other standard drilling equipment.

Caterpillar Tractor Co., Peoria, Ill.—2-wheeled 225-hp DW21 tractor with 20-yd No. 21 scraper.

Central Mine Equipment Co., St. Louis 15—Coalmaster strip-mine augers and Expenda throwaway bits, including NEW No. 360 three-wing Expenda-bit head holding nine bits and featuring a new design that provides greater strength, faster drilling and less bit loss at a lower head cost (*Coal Age*, December 1952, p 114).

Compton, Inc., Clarksburg, W. Va.—Model 36 Compton auger powered by a 150-hp Cummins diesel engine for drilling holes from 28 to 44 in in diam-



McCarthy coal-recovery drill.

Reich Bros. high-speed rotary drill.

eter. Unit is equipped with eight 20-ft auger sections, and features turret discharge pan, pilot pan for guiding auger and eliminating spillage, overhead hoist for auger sections, roller-bearing auger supports, and swiveling pontoons. NEW —Compton high-speed cutter heads, 4½ ft long and 28 to 44 in in diameter, with double flights of 30-in pitch and equipped with Kennametal bits.

Robert A. Cummings Jr. & Associates, Pittsburgh—Aerial mapping and equipment.

E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.—"Nitramon" for overburden shooting, blasting machines designed to eliminate human element in providing current to blasting circuits, and the NEW du Pont Blasting Volt-Ohmeter, a combination galvanometer, stray-current detector and line-voltage tester.

Electric Steel Foundry Co., Portland 10—NEW 6-yd all-welded double-tapered dragline bucket; R7 series box-type points and adapters for draglines; hinge-type chain-repair link; long-bowl wire-rope socket.

Engineering Laboratories, Inc., Garland, Tex.—Model M-7 truck-mounted rotary drill for drilling vertical holes with 20-ft drill pipes. Drills 8¾-in holes to depth of 2,000 ft or 30-in holes to depth of 500 ft.

Firth Sterling, Inc., Pittsburgh 30—Complete line of Firthite strip-mine auger bits, plus throwaway percussion bits and drill steel.

Harnischfeger Corp., Milwaukee 46—P&H draglines, cranes and shovels with Magnetorque control, including the NEW P&H 1855 dragline (*Coal Age*, November 1952, p 118) reported to be largest ever mounted on a single pair of crawler frames. Magnetorque control increases operating speed up to 20%. New unit can handle 10-yd shovel or 8-yd dragline and is available with diesel or electric power unit. Dragline boom of alloy-steel tubular construction combines light weight with strength. Shovel boom has wide foot and features light weight with "toggle-action" crowd motion.

Hendrix Mfg. Co., Mansfield, La.—Latest-model dragline bucket featuring cast 14% manganese lip, chains and fittings.

Hercules Powder Co., Wilmington 99, Del.—Stripping explosives and blasting accessories, including a NEW tapered-end-crimp large-size cartridge said to make loading of rough or ragged drill holes much easier since it slips by or over hole irregularities.

Hughes Tool Co., Houston, Tex.—Hughes TriClone bits with air-cooled bearing, and Models OSC for drilling soft strata, OWS for average duty, and WR7 for hard-rock drilling.

Kennametal, Inc., Latrobe, Pa.—Carbide drill bits and augers.

Koehring Co., Milwaukee—Koehring excavators in capacities up to 2½ yd.

LeRoi Co., Cleveland Lock Drill Div., Milwaukee—LeRoi 105-cfm tractor-compressor combination with "Mobildrill" attachments.

R. G. LeTourneau, Inc., Peoria, Ill.—Model C Tournapull, P-19 Carryall scraper.

Link-Belt Speeder Corp., Chicago 9—Shovel-crane mining applications and power hydraulic controls, an exclusive feature of Link-Belt Speeder units, and a 1:12 operating scale model of the K-375 shovel-crane.

Marion Power Shovel Co., Marion, Ohio—stripping and loading equipment, featuring the 7400 10- to 13-yd walking dragline, the NEW 191-M 10-yd shovel, world's largest on two crawlers (*Coal Age*, January 1952); and the 7800 machine with 35-yd bucket on a 220-ft boom.

Mayhew Supply Co., Dallas, Tex.—Hurricane truck-mounted rotary drill for overburden preparation, equipped with integral air compressor providing 400 cfm for flushing cuttings. Compressor and drill operated by truck engine through power take-off and transfer case, which also supply power to pulldown and draw works.

Mobile Drilling, Inc., Indianapolis, Ind.—NEW Mobile Model B-52 for drilling to 500 ft is designed for one-man operation from skid-, trailer- or truck mount, and features a dual hydraulic cylinder for fast feed with 5-, 6- or 7-ft strokes and 12,000-lb pressure. Adaptable to auger, rotary core or percussion drilling, unit may be operated from independent power or power take off; also, portable prospecting drills to fit 4-wheel-drive vehicles.

Northwest Engineering Co., Chicago 3—Power shovels, draglines, pullshovels and cranes in various types and sizes.

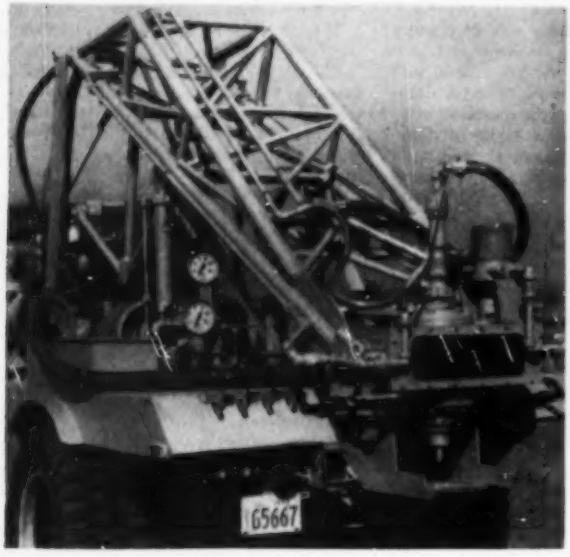
Page Engineering Co., Chicago 38—Page Automatic Armored stripping dragline buckets, including an 8½-yd 233-cu ft-struck bucket featuring design improvements such as a tubular spreader bar for extra strength and economy, stress-relieving breathers in upper back corners of basket and construction of cast manganese steel.

Pioneer Engineering Works, Minneapolis, Minn.—Conveyors and equipment

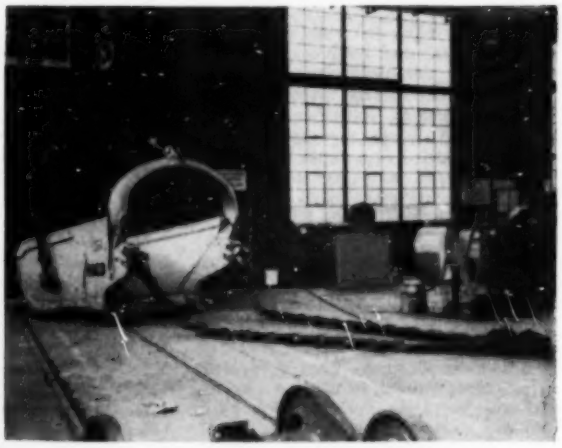
Mobile Drilling overburden drill.

McCarthy vertical-auger shothole drill.

Mayhew Hurricane rotary drill.



Reich Bros. hydraulic rotary prospecting drill.



Electric Steel Foundry heavy-duty 6-yd bucket.

for handling and processing overburden.

Reich Bros. Mfg. Co., Terre Haute—NEW high-speed vertical rotary overburden drill capable of drilling 9- to 12-in hole 80 ft deep in one continuous stroke. Drill rotation is by power unit mounted at top of drill rod. Drill is 94 ft tall and weighs 54 tons. Oilwell type air-jet bits provide cutting edge. Air removes fine cuttings and auger-type drill rod removes large-diameter cuttings and mud. Drilling speeds up to 20 fpm are possible. Unit has 120-rpm and 60-rpm rotary drive speed. Crawler tracks are individually powered by 300-v 120-cycle AC motors.

NEW No. 601 all-hydraulic drill can be mounted on standard long wheelbase 1½-ton or 4-wheel drive truck. Unit is suitable for diamond core and fishtail drilling to depths up to 1,000 ft in a 3-in hole and up to 600 ft in a 6-in hole. Tubular steel mast provides high strength.

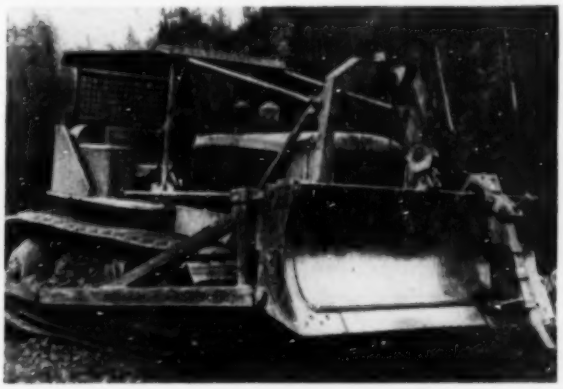
Salem Tool Co., Salem, Ohio—NEW McCarthy vertical-auger truck-mounted shothole drill suitable for all ordinary rock formations. Hydraulically propelled 8-ft carriage travel handles 6- and 8-in-diameter augers in sections 6 ft long. Four-speed heavy-duty transmission and 6.66:1 speed reduction facilitate fast drilling. NEW McCarthy 42-in coal-recovery drill is hydraulically self-moving from hole to hole in the pit by means of mobile skids. The unit will operate in pits only 34 ft long and 12 ft wide. Jacks have 48-in travel. Hydraulically operated crane handles auger sections between the auger carriage and the storage area. Other McCarthy drill units included sizes from 4- to 54-in. and a 30-in coal-recovery auger for thin seams.

Syntron Co., Homer City, Pa.—NEW Model RD-51 gasoline-powered portable rock drill weighing 118 lb without tool and drilling rock up to 20 in per min-

Oliver OC-18 tractor with Heil Trailbuilder.

International TD-18 tractor with Drott 3-yd Skid-Shovel.

Caterpillar No. 6 shovel with 2-yd bucket.



Electric Steel Foundry dozer-rooter.

ute, said to be particularly adaptable to intermittent drilling.

Varel Mfg. Co., Dallas, Tex.—Varel truck-mounted rotary drill featuring air-blast principle for removing cuttings while drilling, and full line of Varel rotary drill bits.

Winter-Weiss Co., Denver, Colo.—Truck-mounted Portadrill with integral air compressor for removing cuttings; also rotary drill bits and finger bits.

Tractors and Tractor-Shovels

Allis-Chalmers Mfg. Co., Tractor Div., Milwaukee 1—TS300 motor scraper, HD-20 with PT power takeoff 203 and 151 PCU control unit; HD-15G crawler tractor with 3-yd bucket; AD motor grader; and the HD-5 hydraulic grade-builder.

Caterpillar Tractor Co., Peoria, Ill.—D8 130-hp diesel tractor with No. 90 27-yd scraper, No. 8S bulldozer and Nos. 24 and 25 cable-control units; tractor with No. 28 ripper, No. 25 cable control, No. 46 hydraulic control unit; and a complete line of rubber-tired equipment, including 4-wheeled 225-hp DW20 tractor with W20 25-yd wagon, and two-wheeled 225-hp DW21 tractor with scraper; also NEW No. 6 shovel featuring standard 2-yd bucket mounted on a 66-hp track-type tractor and designed for balance and stability (*Coal Age*, May, p 162). It is especially designed to handle light maintenance and loading work around stock piles, coal hoppers, strip-mine spoil piles and drainage ditches.

Electric Steel Foundry Co., Portland 10, Ore.—NEW heavy-duty Bucke Forte dozer-rooter can be attached to dozer by one man. Unit costs only one-fourth as much as conventional drawbar rippers and may be adjusted to four rooting depths of 9, 15, 21 and 27 in.

Frank G. Hough Co., Libertyville, Ill.—Models HR and HM 4-wheel-drive Payloaders, and Model HF rear-wheel-drive Payloader.

International Harvester Co., Chicago 1—TD-24 crawler tractor fitted with bulldozer and a Buycrus-Erie B-250 28-yd scraper; TD-18A crawler tractor, equipped with NEW Drott 3-yd Skid-Shovel said to offer higher lift, farther pitch and more digging power, and featuring the added Hydro-Spring that puts the hydraulic system under spring tension and reduces shocks on loader and tractor mechanism to a third of their normal force, thus cutting maintenance and operator fatigue.

Oliver Corp., Chicago 6—Oliver 88 diesel wheel tractor with Strait-Line hydraulic loader; Oliver OC-3 crawler-mounted tractor with the Ware hydraulically controlled loader bucket; and NEW Oliver OC-18 crawler tractor equipped with rear power-control unit and Heil cable-operated Trailbuilder. Developing 133 hp, the OC-18 offers air steering for fingertip control, with better balance, easier handling, greater stability and lower operating and maintenance cost among the design features cited.

R. G. LeTourneau, Inc., Peoria, Ill.—Super C Tournatractor, bulldozer blade.

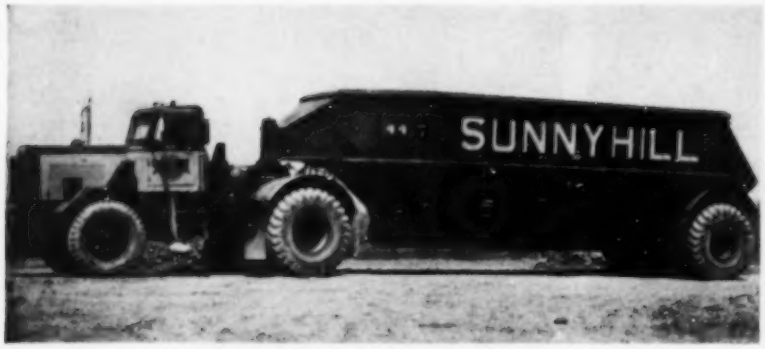
Trucks, Engines Generators

Buda Co., Harvey, Ill.—NEW 6-DAS-516 165-hp supercharged diesel engine for on-highway trucks; 8-DAS-1125 heavy-duty diesel engine with Twin Disc torque converter for large trucks; 6-DAS-844 diesel with Torcon converter for powering 2- to 2½-yd shovels; and 7½-kw diesel-electric generator set.

Calcium Chloride Institute, Washington, D. C.—Information on filling truck and tractor tires with calcium-chloride solution to increase drawbar pull and stability.

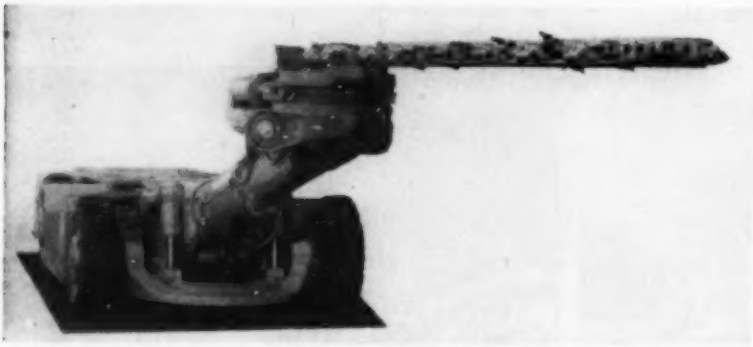
Caterpillar Tractor Co., Peoria, Ill.—D397 electric set, 315 kw intermittent; D318 electric set, 60 kw intermittent; 225-hp D337 diesel engine.

Cummins Engine Co., Inc., Columbus, Ind.—200-hp Model NHB-600 horizontal diesel engine for underground locomotives; 550-hp Model NVHS-1200 diesel



Dart Model 145 60-yd coal hauler.

Bowdil 1-29 heavy concave bit.



Goodman 2400 universal cutting machine.

for excavating equipment, generator sets and off-highway trucks.

Dart Truck Co., Kansas City 8, Mo.—NEW Model 145 60-yd bottom-dump coal hauler featuring rugged construction and positive air-operated doors (*Coal Age*, April, p 114).

Detroit Diesel Engine Div., General Motors Corp., Detroit 28—Three "71" series diesel engines, 3- and 6-cylinder models for loaders, power shovels and heavy haulage units; 6-110 diesel, highest-horsepower single-engine unit.

Euclid Road Machinery Co., Cleveland 17—40-ton single-tire Euclid coal hauler, 10-speed transmission or Allison torque converter and semi-automatic transmission, hydraulic booster steering; 22-ton Euclid reardump truck, torque converter and semi-automatic transmission, hydraulic booster steering.

Harnischfeger Corp., Milwaukee 46—NEW diesel-electric generator set.

Hercules Motors Corp., Canton, Ohio—Hercules engines representing a 68-model line in 2-, 4-, 6- and 8-cylinder units from 3 to 500 hp, including those used in underground operations in metal mines.

International Harvester Co., Chicago 1—Diesel engines; and NEW International 1953 line of trucks, including the heavy-duty coal-type RFD 302 unit featuring a 145-in wheelbase and equipped with a NHB 600 diesel engine, and a R-110 115-in-wheelbase truck with a 6½-ft all-steel pickup body.

Koehring Co., Milwaukee—Koehring Model 60 Dumptor 6-yd off-highway haulage unit with equal speed of travel in each direction.

Murphy Diesel Co., Milwaukee 14—Engine and generator sets, featuring 100-kw DC coal-mine compounded unit.

Oliver Corp., Chicago 6—Oliver 199 (73-hp) and 166 (31-hp) power units available either for diesel operation or as gasoline, LP-gas or natural-gas units.

R. G. LeTourneau, Inc., Peoria, Ill.—E-18 Tournarocker, Model C Tournapull.

Face Preparation

Acme Machinery Co., Williamson, W. Va.—Rubber-tired, self-propelled and stationary air compressors for underground applications.

American Cyanamid Co., New York 20—American "Container-Cartridge" shipping and loading container; other American products, including new line of plastic-covered leg wires for greater visibility and safety.

Austin Power Co., Cleveland 13—Complete line of rotary-type drilling tools, including throwaway bits, tungsten-carbide drill bits and cutting-machine bits, plus percussion-type bits for stoper work.

Bemis Bro. Bag Co., St. Louis 2—Tamping bags.

Bowdil Co., Canton 1, Ohio—Cutter bars, cutter chains, picks, rope sockets and bits, including the NEW No. 1-29 heavy concave double-pointed throwaway-type bit featuring a wider cutting face (*Coal Age*, January, p 128). As bit wears, the cutting face is maintained because of the concave design of the bit body.

Carboloy Dept., General Electric Co., Detroit 32—Expanded line of new mining tools, data on care and sharpening.

Cardox Corp., Chicago 1—Airdox equipment, standard drilling equipment.

Central Mine Equipment Co., St. Louis 15—Complete line of Coalmaster coal augers, drill tools, throwaway bits, etc.

Chicago Pneumatic Tool Co., New York 17—Permissible, hand-held, post-mounted and mobile drilling units.

Cincinnati Mine Machinery Co., Cincinnati 25, Ohio—Cincinnati cutter chains, bars, bits, and sprockets, including carbide bit for use on all types of chains recently added to round out line.

Coal Mine Equipment Sales Co., Terre Haute, Ind.—Rebuilt rubber-mounted cutting machines.

Dooley Bros., Peoria, Ill.—Permissible mobile coal-drilling truck with latest safety devices; also various post assemblies, repair and exchange parts for Superior electric coal drills.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.—Chemechol chemico-mechanical coal-breaking method; du Pont permissible explosives; and blasting accessories, such as, caps and blasting machines.

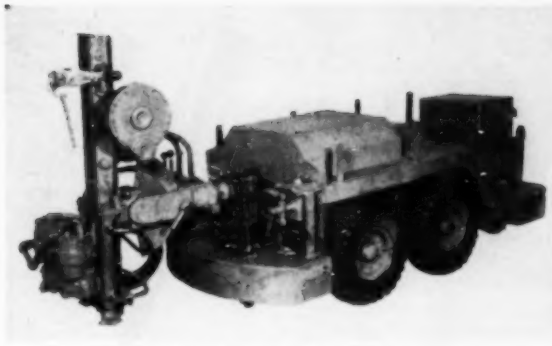
Firth Sterling, Inc., Pittsburgh 30—Complete line of Firthite "Blue Bit" machine and drill bits.

Fulton Bag & Cotton Mills, New York 17—Scotch-Seam tamping bags.

Goodman Mfg. Co., Chicago 9—NEW Type 2400 low-type rubber-mounted permissible universal cutting machine, featuring full hydraulic control of all machine movement except cutter chain, fast tramming with hydraulically controlled speeds up to 220 fpm, rapid cutting with cutter chain driven by 50-hp motor and positive, variable-speed hydraulic feed of cutter arm, 90-in wheelbase for full mobility even in restricted areas, versatile cutting range without blind spots with pivot points at turntable and cutter-chain sprocket for horizontal swing to permit cutting wide rooms, breakthroughs and around timbers, and hydraulically driven bugduster available for bottom cutting; also Goodman 812 short-wall cutting machine.

Hercules Powder Co., Wilmington 99, Del.—Permissible explosives and blasting accessories, including V.A.O. blasting meter combining a voltmeter, ammeter and blasting galvanometer in one unit.

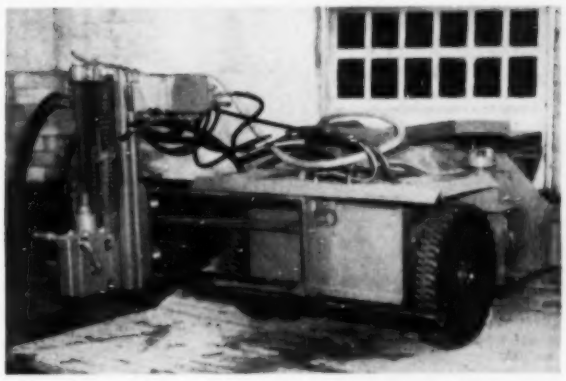
Jeffrey Mfg. Co., Columbus 16, Ohio—



Joy RBD-15 roof bolting drill.

Fletcher permissible roof drill.

MSA bolt-hole cleaner.



Fletcher Hydroslide roof-control drill.

Jeffrey Type 70-UR universal coal cutter; Jeffrey shortwall coal cutters; 56 FHR rubber-tired boom-type drilling machine with tramming and cable-reel operation hydraulically powered; Jeffrey post-mounted and hand-held drills.

Joy Mfg. Co., Pittsburgh 22—Sulmet tungsten-carbide bits; rock bits in throw-away and Sulmet tungsten-carbide-tipped types; Joy cutter chains with new design feature utilizing closer tolerances and high-quality forgings and heat-treated alloy steel; 12-RB rubber-tired mobile cutter for very low coal, supplied as bottom or top cutter with horizontal cutting range of 30 ft and over-all height of 26 in; Joy hand-held drills; NEW CD-42 double-boom rubber-mounted mobile coal drill providing continuous auger feed of 10 ft, with a drill extension giving a drilling range of 21 ft without moving machine. In operation, drill head is positioned against face and held by a positive locking device so that hole is spotted automatically and then drilled, with drill held in position until hole is completed and auger retracted. All drilling controls are at tramming position for operator safety, and dual controls are available.

Kennametal, Inc., Latrobe, Pa.—Cemented-carbide cutter bits, drill bits and augers; NEW rotary bits and sectional threaded auger bits for longhole drilling.

LeRoi Co., Cleveland Rock Drill Div., Cleveland 11—Rock drills; NEW air leg, Model AL90, for rock drills; NEW LeRoi Cleveland HD1 32-lb hand-held hydraulic coal drill that can be powered from any hydraulic system, featuring speed, freedom from shock and safety to the operator.

Newcomer Products, Inc., Latrobe, Pa.—Complete line of NP carbide mining tools, including machine and drill bits.

National Mine Service Co., Beckley, W. Va.—"Quick-Seal" and "Permi-Seal" permissible tamping plugs for bituminous shot firing.

Olin Industries, Inc., Explosives Div., E. Alton, Ill.—Rubber-tired Armstrong Airbreaker with a new-type shell featuring a metal rupture-disk instead of a shear pin to release the coal-breaking air pressure; also Western Cartridge blasting caps and other blasting accessories.

Precision Chain Co., Terre Haute, Ind.—Precision cutter chains, both standard universal types for ½x1-in bits and Multiplex type for Rockbuster-Multiplex double-end bits; cutterbars, chain links, bits and bit holders; featuring NEW Precision universal cutter chain for NEW Precision "Middle Track" cutterbar that offers greater strength and operating efficiency through a design putting lateral stresses against middle bar instead of spreading the cutter chain; and NEW 10-tooth sprocket providing improved roller action with 10 teeth instead of five.

Frank Prox Co., Terre Haute, Ind.—Cutting chains, cutter bars, cutter bits, sprockets.

Schroeder Bros., Pittsburgh 1—New-type hydraulic hand-held drill for coal mines, and hydraulic unit to power drill from a shortwall cutter.

Tamping Bag Co., Mount Vernon, Ill.—"Seal-Tite" wet-strength tamping bags.

Bertrand P. Tracy Co., Pittsburgh—Cutter chains, gears, pinions.

Vascoloy-Ramet Corp., Waukegan, Ill.—Machine and drill bits, including the NEW Style DB carbide-tipped auger drill bit offering larger bit area, longer tool life, easier faster feeding and 60% coarser cuttings and reduced grinding

Roof Control

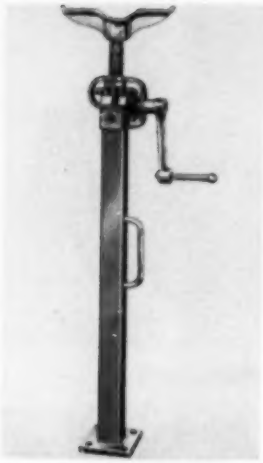
Acme Machinery Co., Williamson, W. Va.—NEW rotary stoper and NEW USBM-approved dust collector for roof drilling; also complete line of roof-bolting stopers and impact wrenches.

Armco Drainage & Metal Products, Inc., Middletown, Ohio—Steel liner plate for entries, haulageways and shafts.

Bethlehem Steel Co., Bethlehem, Pa.—NEW 2-piece expansion shell especially designed to achieve good anchorage in soft strata, with twice the expansion in previous models; also hollow drill steel and other types of roof bolts.

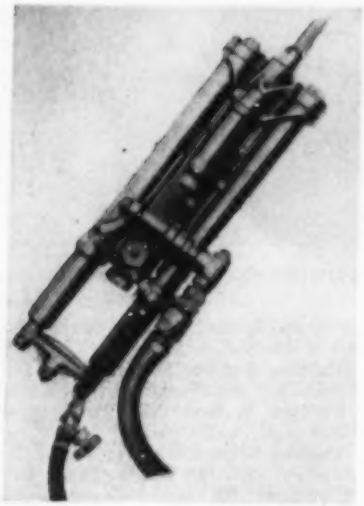
Browning Dust Collector Co., Hampden, W. Va.—Browning bag-type heavy-duty dust collector for percussion drilling operating on compressed air to create vacuum without use of motors, and NEW box-type collector unit designed to replace bag-type where desired; also NEW permissible bag-type dust collector for rotary roof drilling applicable with any upward vertical drill, featuring gravity

Joy lightweight air leg.

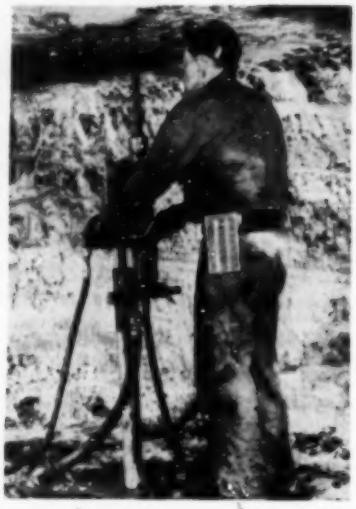


Simplex 642 bevel-gear timber jack.

Pattin expansion-type roof bolt.

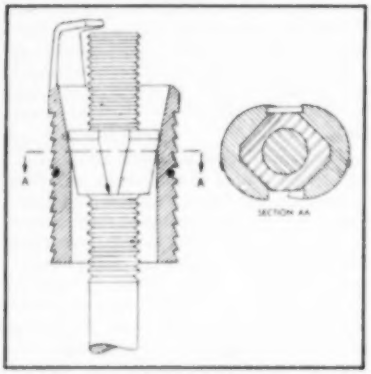


Chicago-Pneumatic 134 short stoper.



Holman Dryductor roof-bolting drill (Goodman).

Dowty hydraulic pit props.



Bethlehem soft-strata roof bolt.

operation without motor or power and equipped with a spring jack holding collector firmly against roof.

Central Mine Equipment Co., St. Louis 15—Coalmaster line of roof augers, including NEW Coalmaster "Roofbolter" augers and drill rods for superior wear and break resistance in either wet or dry drilling (*Coal Age*, May, p 160).

Chicago Pneumatic Tool Co., New York 17—Electric and air-operated roof-bolting equipment, including all-electrical RBD-30 mobile bolting unit, and NEW CP-134 short stoper, wet or dry, featuring in-line feed combinations handling steels up to 42 in. Rotation release permits driving wedge-type bolts fast.

Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div., New York 22—Full line of roof bolts.

Dowty Corp., New York 4—Dowty hydraulic pit props originated abroad primarily for longwall roof support—a quick-setting, high-initial-load steel prop that may be put in position within 45 sec and released in 10 sec from a remote position. Better roof control is provided with cushioning effect of hydraulic force, and safety valve prevents overloading by permitting prop to shorten when roof weight per prop reaches 20 tons.

Duff-Norton Mfg. Co., Pittsburgh 30—Roof jacks developed for roof-bolting.

Elreco Corp., Cincinnati 25—Elreco roof-bolting system and equipment.

Firth Sterling, Inc., Pittsburgh 30—Complete line of Firthite "Blue Bits" for roof drilling.

J. H. Fletcher & Co., Huntington, W. Va., and **Baker Raulang Co.**, Cleveland 2—NEW Fletcher roof-bolting machine featuring Hydroslide which permits bolting 12-ft width without maneuvering machine, with dust collector or timbering attachments as optional equipment. Rubber-tired unit powers its own track-mounted tramcar for flexibility in working combination track and trackless mines. Controls permit changes in drilling speed to compensate for hardness of rock.

Goodman Mfg. Co., Chicago 9—NEW Holman Dryductor roof drill offering high efficiency in dust collection, drawing dust through holes in bit through hollow drill rod to cyclone filter and collector unit. Presently connected to a 3-wheeled rubber-tired collector truck, the unit is to be available adapted to American methods and mounted on a rubber-tired self-propelled truck.

Irwin Foundry & Mine Car Co., Irwin, Pa.—Roof drill.

Jeffrey Mfg. Co., Columbus 16, Ohio—Jeffrey roof-drilling machines, including Type 56RDR, a rubber-tired unit fea-

turing a hydraulically powered drill head containing a drill socket and impact wrench together, with hydraulic positioning of the drill boom both horizontally and vertically.

Joy Mfg. Co., Pittsburgh 22—Portable Mine-Air and stationary compressors; NEW lightweight air leg weighing only 39 lb designed to reduce operator fatigue and permit easy drilling of awkward and "hard-to-get" holes; telescopic-feed stopers in various sizes including NEW SAE-91 short-length stoper for roof-bolting in low seams, featuring 14-in steel changes and 17½-in drill travel, also available for thicker seams; and NEW RBD-15 roof-bolting drill, a rubber-tired self-propelled unit with a hydraulic 2-speed drill offering high speed for drilling and low speed for tightening bolts, both on the same spindle. Right-hand and left-hand wheels are individually operated to provide high maneuverability.

Kennametal, Inc., Latrobe, Pa.—NEW rotary bits for drilling bolt holes and full line of carbide roof bits for rotary and percussion drilling, augers and pinning rods.

LeRoi Co., Cleveland Rock Drill Div., Cleveland 11—Roof-bolting drills and equipment.

Newcomer Products, Inc., Latrobe, Pa.—NP bits for roof-bolting.

Ohio Bass Co., Mansfield, Ohio—O-B expansion shells and plugs for roof-bolting, stressing holding power, torque-tension relationships, and importance of hole size.

Oliver Iron & Steel Corp., Pittsburgh 3—Split-rod and expansion-shell roof bolts and full line of industrial fasteners.

Osmose Wood Preserving Co. of America, Buffalo 9—Osmose timber preservation method; wooden mine roof plugs.

Pattin Mfg. Co., Marietta, Ohio—NEW-style expansion shell in which the wedge nut is replaced by forming the wedge directly on the bolt, so that tightening is done by turning a nut at the bottom of the bolt instead of the bolt itself; also, full line of roof bolts and bolt accessories.

Pittsburgh Screw & Bolt Corp., Pittsburgh 30—"Pit-Bolts" in expansion and split types; machine bolts of various sizes; double-grip spikes for reinforcing split ties and other timbers.

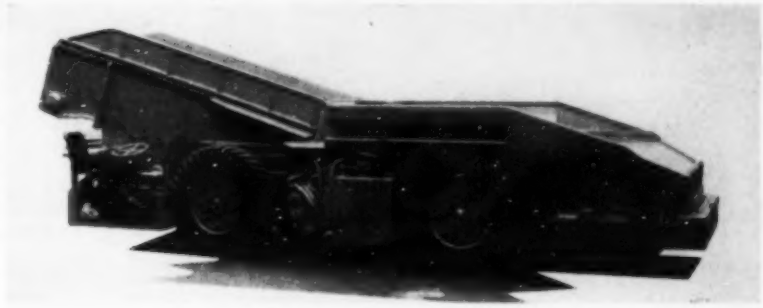
Ruger Equipment, Inc., Uhrichsville, Ohio—NEW hand-powered hydraulic "Timberlift" timber setter, a simply operated unit easily mounted on timber car or mine car to provide for lifting and handling of timber up to 1 ton with only 20 to 40 lb of effort (*Coal Age*, May, p 106).

Star Jack Co., River Grove, Ill.—Star aluminum screw-type safety roof jacks; Star hydraulic foot-operated timber and roof-bolt setter, easily handled and operated by one man.

Templeton, Kenly & Co., Broadview, Ill.—Simplex roof and timber jacks; post-pulling jacks; and NEW No. 642 bevel-gear timber jack featuring increased speed of operation compared with conventional screw types.

Timken Roller Bearing Co., Canton 6, Ohio—Timken Rock Bits for roof-bolting.

Myers-Whaley crawler-mounted transfer car.



Jeffrey 67-A4 high shuttle car.

U. S. Bureau of Mines, Washington 25—Roof-bolting methods and equipment, including Optical Stratascope for visual observation of holes up to 9 ft deep.

United States Rubber Co., New York 20—NEW matchless wirebraid mining air hose features steel braid reinforcement rather than conventional cord.

Vascoloy-Ramet Corp., Waukegan, Ill.—Roof-bolt drills and tools, emphasizing tool grinding and handling to "Cut Roof-Bolting Costs."

West Virginia Steel & Mfg. Co., Huntington 6, W. Va.—Complete line of roof-bolting materials, including channels, universal and flat washers, bolts, and expansion units and wedges applicable to bolts, including wedge- and plug-type expansion bolts.

Joseph Woodwell Co., Pittsburgh 22—NEW Ruflok compound specially prepared for sealing mine roof against scaling and spalling and also applicable for sealing haulageway ribs, cement-block and temporary brattice-cloth stoppings and airways; plus Ruflok spray unit for its application.

Mine Cars, Shuttle Cars, Locomotives, Tractors, Track

American Car & Foundry Co., New York 8—Large-capacity all-steel drop-bottom ACF cars for mine service.

American Mine Door Co., Canton 6, Ohio—Improved Canton track cleaner for narrow entries, low coal, 1 tpm on dirty track; Canton automatic switch-thrower.

Baker-Raulang Co., Cleveland 2, and **J. H. Fletcher Co.**, Huntington, W. Va.—Rubber-tired mine trikes, Baker permissible mine tractor and trailers.

Bethlehem Steel Co., Bethlehem, Pa.—Heavy-duty 85-lb prefabricated track with specially designed short switch points for mine service to promote easier switch action; steel mine cars; forged mine-car wheels.

Brown-Fayro Co., Johnstown, Pa.—New-type "Brownie" HS-15 hydraulic car spotter.

Coal Mine Equipment Sales Co., Terre Haute, Ind.—Rebuilt late-type locomotives.

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.—Coal-handling equipment, including rotary car dumpers, sheave wheels, skips, cages, feeders and related units.

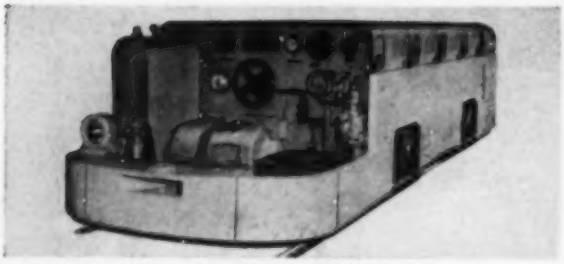
Dart Truck Co., Kansas City, Mo.—NEW 18-ton underground ore-hauling unit, powered by a 275-hp diesel engine with air scrubber. Torque converter provides smooth operation. Unit features heavy truck-type construction.

Differential Steel Car Co., Findlay, Ohio—Mine cars and mine-car parts.

Enterprise Wheel & Car Corp., Bristol, Va.—NEW aluminum mine car weighing 2,803 lb less than same capacity steel car. Features are resistance to corrosion, absorption of vibration, and resistance to splitting and tearing for lower maintenance.

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.—GE track-laying shuttle car operating on DC power from a NEW 50-kw portable selenium rectifier.

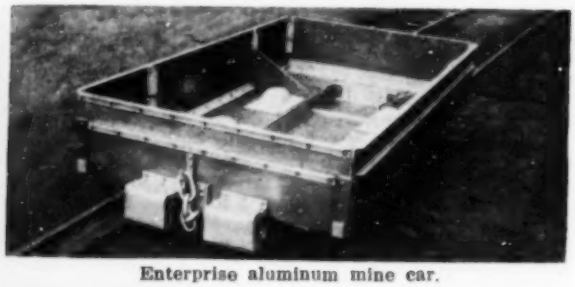
General Equipment & Mfg. Co., Louisville 6, Ky.—NEW line of automatic block signals, trolley contactors, electric switches and related equipment, including Gemco plug-in block signals, trolley contactor specially designed to prevent rebound, and "Trakswitch" electric track switch fitting all turnouts and featuring



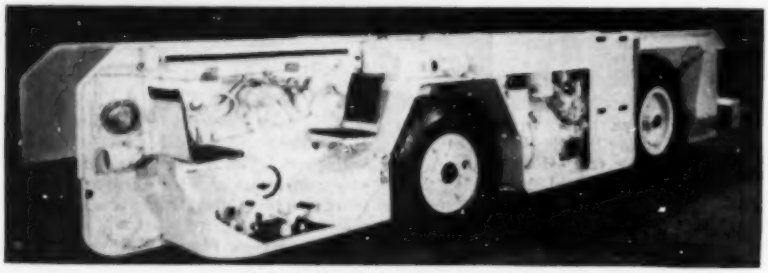
National Mine Service diesel locomotive.

Hunslet 170-hp diesel-mechanical mine locomotive.

Dart underground mining truck.

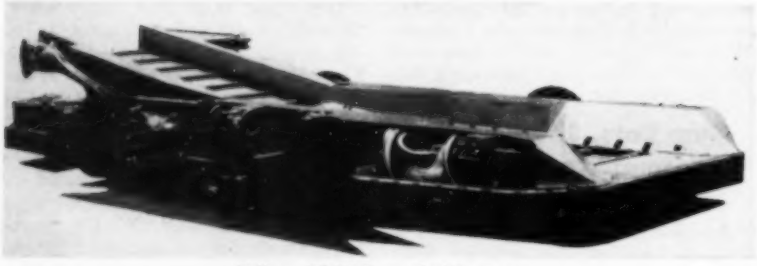


Enterprise aluminum mine car.



Joy 60-E-12 diesel-electric shuttle car.

Goodman 583 shuttle car.



Jeffrey 68-A4 low shuttle car.

all-welded cold-rolled-steel construction and waterproofed fast-acting mechanisms for contactors and indicating lights.

Goodman Mfg. Co., Chicago 9—NEW Goodman Type 583-42 permissible shuttle car with fixed-height discharge and four motors, featuring 4-wheel drive and 4-wheel foot-operated hydraulic brakes; 4-wheel manual steering with hydraulic booster; NO-SPIN differentials and magnetic control with automatic acceleration.

Robt. Holmes & Bros. Co., Danville, Ill.—Holmes hoisting equipment, including hoists, sheaves, cages, skips, automatic skip and cage-loading and dumping devices.

Hunslet Engine Co., Ltd., Leeds 10, Eng.—NEW 170-hp fully-flameproof diesel-mechanical locomotive specially designed for American mines, featuring Cummins flat diesel engine, Hunslet 4-speed transmission and a hauling capacity of 600 tons. Weighing 37,000 lb, 7 ft wide and 39 in high, the 42-in-gage unit is said to meet regulations of the USBM and Canadian Mines Dept. For gassy operation, safety features include audible alarms if exhaust exceeds certain temperatures or if vacuum in air intake becomes excessive. Also shown was a 15-hp fully conditioned diesel-mechanical locomotive for secondary haulage in non-gassy mines, with air-cooled diesel, weighing 6,000 lb., 44 in high and a haulage capacity of 65 tons.

Irwin Foundry & Mine Car Co., Irwin, Pa.—8-wheel mine cars.

Jeffrey Mfg. Co., Columbus 16, Ohio—13-ton Jeffrey main-line locomotive; three NEW Jeffrey permissible cable-reel shuttle cars, 250 and 500 v, featuring 4-wheel drive and steer, 2-speed reversible conveyor, force-ventilated control cases positioned on swinging doors to permit ready access for easy maintenance. Cars were as follows: Type 67, 48 in high with 12-in sideboards, average topping, 8 tons, 10- or 15-hp motors; Type 66, 42 in high with sideboards, 5-ton topping, 7½- or 10-hp motors; Type 68, 24 in high without sideboards, 2¼ tons, 7½-hp motors.

Joy Mfg. Co., Pittsburgh 22—Joy 8-SC and 10-SC shuttle cars, the latter featuring new 15-hp traction motors permitting travel up 5.2 mph empty and 4½ mph loaded; NEW 60-E-12 diesel-electric shuttle car handling rock or ore loads up to 14 tons, designed to carry

Turn to p 126 for continuation of this Equipment Show Report

When you want them...
Where you want them...
FIRTHITE "Blue Bit" MINING TOOLS

THE STRONGEST BRAZE IN ANY CARBIDE TOOL!

Designed with cutting edges on 3 sides to eliminate tool wear, binding and power drag. Special alloy steel shank.

In the heart of every mining district there is now an Austin Powder Company stock of FIRTHITE "Blue Bit" Mining Tools for immediate delivery. To serve you better than ever, Firth Sterling, the manufacturer, and Austin Powder, as national distributors, have "teamed up" to put FIRTHITE "Blue Bits" *where* you need them, *when* you need them.

You can count on this rugged, dependable, proved-in-the-mine line of machine bits, auger and roof drill bits and finger (strip) bits in styles and sizes to meet every mechanized mining need.

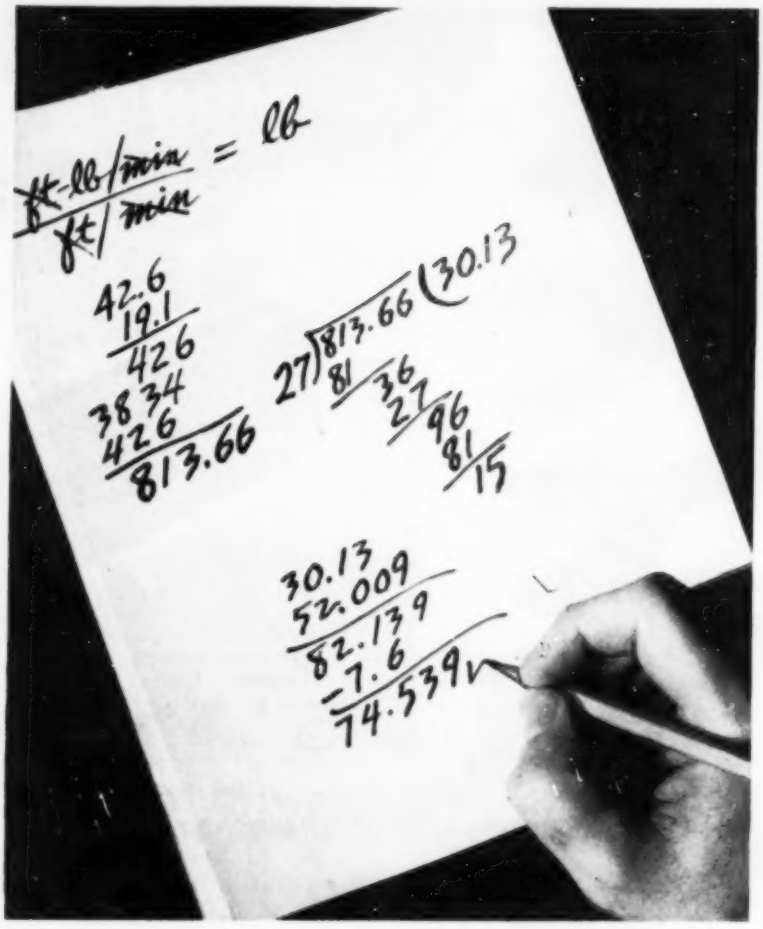
Manufactured by
Firth Sterling INC.
GENERAL OFFICES: 3113 FORBES STREET • PITTSBURGH 30, PA.

Distributed by
AUSTIN POWDER COMPANY
428 Rockefeller Building
Cleveland 13, Ohio

Foremen's Forum

"Twenty Questions"

For our school population, the month of June is the traditional time for promotion, perhaps, graduation and, in any event, TESTS. For your own amusement, try this one. You'll either amaze yourself with what you've retained or shock yourself with how you've slipped.



HERE ARE SOME QUESTIONS designed to provide you with a bit of mental exercise. In the way of equipment, you'll need a pencil to write your answers in the spaces provided at the end of this test, a minimum knowledge of arithmetic and an active memory. Answers are given elsewhere in this issue, as noted at the end of the test. We do not guarantee against the hazards of curve-ball questions. On guard! Read the problems carefully!

1. Which of the following values most closely approximates the specific gravity of methane? 1.555. 1.02. 0.559. 0.98.

2. If your company buys timber at 7c per board ft, how much will it pay for three dozen 5x6-in by 12-ft crossbars?

3. What is the distance from one corner of a 45x60-ft rectangular pillar to the diagonally opposite corner?

4. If the voltage-drop is 10 v in a section of trolley wire carrying a current of 150 amp, what is the resistance of that section of trolley wire?

5. If demands for better ventilation required the use of a regulator, would you install the regulator in (a) the high-resistance split or (b) the low-resistance split?

6. A fully-loaded 100-hp motor, operating at rated voltage and current, drives a pump which is delivering 1,250 gpm against a total head of 268 ft. What is the over-all mechanical efficiency, in per cent, of the motor-and-pump system?

7. What is the weight of the water in a vertical cylindrical tank 10 ft in diameter, if the tank is filled to a depth of 4 ft?

8. If the water is removed from the tank described in Question 7 and replaced to the same 4-ft depth with a calcium-chloride solution of 1.2 sp gr, what is the weight of the liquid in the tank now?

9. How many gallons of water were in this tank (Question 7) in the first place?

10. How many gallons of calcium chloride are in it now?

11. In a belt drive, a pulley with a radius of 6 in is driving a pulley 2½ ft

Here are the factors we used in our solutions . . .

A gallon of water weighs 8.3 lb
A gallon contains 231 cu in
A cubic foot of water weighs 62.4 lb
One horsepower equals 746 watts
π (pi) is 3.1416

GUARANTEED UNIFORMITY

plus

99% SEPARATING EFFICIENCY

A "Fairmont-Built" plant will enable you to attract and hold important premium markets . . . Fairmont designs, fabricates and erects preparation plants that enable you to produce coal of uniformly high chemical and physical properties and permit you to compete favorably for your share of important premium markets.

A "Fairmont-Built" plant utilizing the services of our own personnel and all under one contractor's responsibility assures you of efficient operation, low maintenance cost, and uniformity of product.

Consult a Fairmont Engineer for the answer to your coal preparation problems.

FAIRMONT MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

Designers and Constructors of Complete Coal Preparation Plants Using Both Wet and Dry Cleaning, Centrifugal and Thermal Drying

in diameter. If the driving pulley is operating at 225 rpm, what is the rim speed of the driven pulley in feet per minute? (Disregard slip.)

12. A mechanic rigs a block-and-tackle system to lift a heavy armature. He and his buddy pull 3½ ft of rope through the system to raise the load 6 in. What is the mechanical advantage in the mechanic's rigging?

13. A loaded mine car weighs 7½ tons. If the rolling-friction factor is 0.010, what is the tractive effort, in pounds, that will be required to haul the car at a uniform speed over a level track?

14. What is the total cost of the electrical energy required to operate a 100-hp motor for a period of 22 hr at an average unit cost of 1½c per kwh?

15. One day in the Midwest, where roads are straight, a strip-mine operator left the office and traveled due north in his automobile at a speed of 36 mph. At the instant he left the office, the maintenance superintendent also left the same place in the company-owned jeep, and he traveled due east at a speed of 27 mph. Both vehicles were equipped with 2-way radio sets having a maximum transmitting range of 75 mi. After 2 hr had elapsed, the operator placed a call to the maintenance superintendent. Did he get his party?

What a Foreman!

For many years Sir Leonard employed an Arab foreman named Hamoudi. . . . Once, he says, he showed Hamoudi the huge stone [64 ft long and high in the wall of an ancient temple] in the wall at Ba'albek: "He sat in silence, looking at it, for perhaps twenty minutes, and then rose to his feet. 'I must go away,' he said, 'my head aches'; and as he went I heard him murmur, 'By Allah, *what* a foreman!' "

—From Book Review by Margaret Parton, New York *Herald Tribune*.

Here Is Where You Jot Your Answers . . .

1.	————	11.	————
2.	————	12.	————
3.	————	13.	————
4.	————	14.	————
5.	————	15.	————
6.	————	16.	————
7.	————	17.	————
8.	————	18.	————
9.	————	19.	————
10.	————	20.	————

Our answers are on p 178, and we'd like to make this wager with you. On the ones you missed, it wasn't your arithmetic at fault. It was failure to read the problem. This is a long way to go to make the point that reading demands a careful approach.

On the matter of ratings, we'll set up these arbitrary standards. Anyone with fewer than seven correct answers should "hit the books" at least one evening a week. Those with more than 18 correct answers may spend another evening a week out with the boys. From 14 to 18 correct is good, and from 7 to 13, inclusive, is only fair.

16. A gas feeder is emitting methane at a rate of 60 cfm. What is the volume of fresh air required to keep the methane content below 1.0% in the immediate return?

17. Which of the following is the closest approximation of the square root of 2? 0.5. 4.0. 1½. 1.414.

18. A paint manufacturer says his large-size can of rust-preventing primer will cover 400 sq ft. How many of these cans of primer would you requisition to coat a circular stack which is 66 in in diameter and 41 ft high? (You can trust the manufacturer's estimate.)

19. You are placed in charge of the job of installing a waterline for the washhouse. You will need an inlet trench 18 in wide, 5½ ft deep and 29 ft long from the supply main to the building connection. You are assigned two men for the job, and under the existing conditions, the older man can remove ¾ cu yd per hr and the younger fellow can remove ½ cu yd per hr. Can they finish the trench in one 8-hr shift?

20. What is the total cost of the following list of supplies?

325 roof-bolt assemblies @ $1.25 ea.

74 cutting machine bits @ $1.19 ea.

150 cappieces @ 62c per dozen.

7½ dozen rolls of friction tape @ 97c per roll.

The DW10 keeps your shovels swinging

An idle shovel costs you money. But a quick-moving Caterpillar DW10 wheeled Tractor hitched to a W10 Wagon will relieve you of that headache in stripping.

The answer is in this big yellow unit's speed over rough going and smooth handling, combined with its quick dumping time. Add to this the easy loading of this Cat* Wagon, and you can't miss getting more work done each day.

The wagon was designed for your work. Besides a high windrow clearance, it has good sidehill stability. It hauls 8.9 yards struck, 14 yards heaped. And its generous size bowl provides a "can't miss" target for shovel or dragline loading.

Dumping is speeded with a hydraulic ram which puts the operation under complete control of the operator. And he can open the doors to any position to regulate dumping speed. In addition, the doors can be opened or closed at any time, whether the wagon is moving or stationary.

These units are all Caterpillar-built—Tractor, Engine, and Wagon. They are designed as a team to give you the quickest, most dependable and productive hauling you can get.

Your Caterpillar Dealer will be glad to demonstrate these durable units for you. And when you buy one, you can rely on him for quick, expert service.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

Operating Ideas

HOIST INSTALLATION is greatly simplified by passing rope (left) through slot in rib corner to hoist in adjacent heading (right) using coal rib as anchorage and eliminating need for a sheave. Bag in right photo holds rock-dust for fire-fighting. Difficult slate roof is held by bolts.

Two "Tricks" Cut Time and Cost in Loading Mine Cars

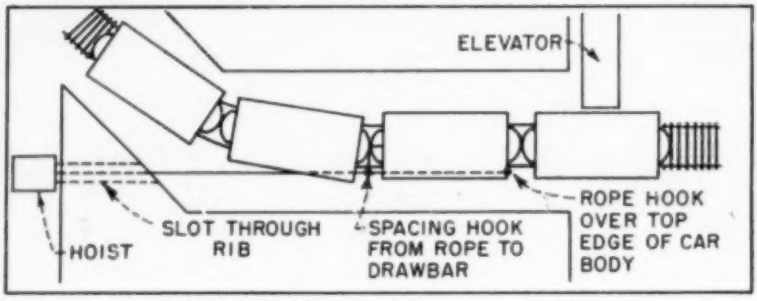
TWO "TRICKS OF THE TRADE" in handling mine-car trips past loading heads are saving considerable time in Mine No. 5 of the Red Parrot Coal Co., Prenter, Boone County, W. Va. For the first, which reduces cost of the hoist installation, a cutting machine cuts a slot through a corner rib for passage of the wire rope, thus permitting placing the hoist in the adjacent heading with the coal rib as anchorage, without use of a sheave. The second features a rope-spacing hook attached to the front drawbar of the car to which the hoist rope is hooked to prevent derailments of the rear wheels of the car.

These photographs were made in No. 9 drift of No. 5 mine, in a development section where five headings are being driven with Joy 14 BU loaders and Joy shuttle cars discharging via elevators to mine cars. The track plan utilizes circle haulage on which trips being loaded are pulled by a Brownie hoist.

The rib corner through which the rope passes is a 45-deg point, and to penetrate it the cutting machine sumps in from both sides. Expense of setting-up the hoist is very low because one corner is placed against the rib and a post is laid on the floor to brace against slewing.

In operation, the rope works parallel to to the straight part of the loop track. It is hooked to a car by bringing it under the flared side of the body and dropping the hook over the back edge of the car.

Sometimes derailments occurred when the rope began to pull at a slight angle as the car moved onto the curve. Such a derailment was more likely to occur when a number of loads were being pushed



TIME-SAVING LOADING SETUP, showing location of hoist in adjacent heading and car positions when the rope-spacing hook comes into play to minimize any tendency to slew and derail the car.

DETACHABLE HOOK suggested by loading-head operator (left) prevents derailments by keeping the rope from moving farther from the center as the car moves onto the curved track. End of rope is hooked over back edge of car (right).

Kennametal Bits
Cut 10 times more places per bit life

at Vinton Coal and Coke Co.

POWER SAVED

Use of Kennametal Cutter Bits has reduced power consumption by as much as 30% to 50% in typical Penna. and W.Va. mines. The comparisons were made using either tong-testers or watt-hour meters.

BITS STAY SHARP LONGER

The Kennametal Bit illustrated is typical of a set that cut 100 places (Winifred Seam, W.Va.) before being sharpened. Bits were still capable of cutting several hundred more places.

The severe cutting conditions at Vinton Coal and Coke Co. had often made bit changing necessary after each place cut. Bits had to be discarded after cutting a maximum of only 10 places.

The company decided to change to Kennametal to increase their tonnage per shift. They have found that Kennametal U-1 Bits give them greater production, as expected, by cutting 100 places to the other bits' 10. Important *additional* savings in time, power output, and bit sharpening costs were also effected. *Overall savings,* mine executives estimate, *amount to 5¢ per ton.*

Kennametal Bits give outstanding service because of their practical, proven design, and because their tough, Kennametal tips have shock and wear-resistant qualities equalled by no other tungsten-carbide in the coal industry. Your Kennametal representative —a veteran mining man—will gladly go into your mine to demonstrate and prove how these Kennametal advantages can reduce *your* cutting or drilling costs. Get in touch with him today!

Kennametal Inc., Mining Tool Div., Bedford, Pa.

KENNAMETAL®

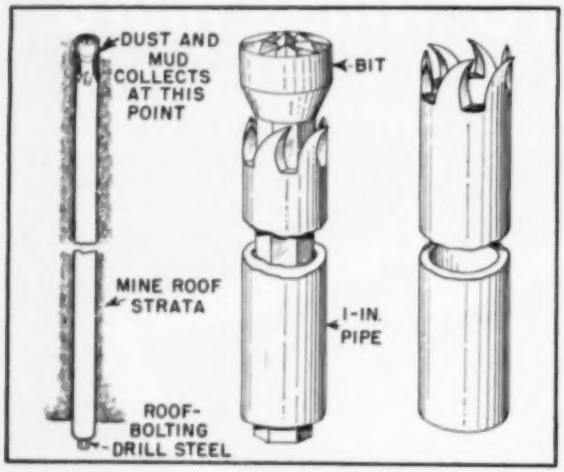
Quality Carbide Of The Coal Industry

World's Largest Manufacturer of Tungsten-Carbide Mining Tools

around the curve onto the haulageway.

Charles Huffman, the loading-head operator, suggested the rope-spacing hook now being used. It is hooked over the drawbar to keep the rope from moving out and increasing the force that tends to pull the back end of the car toward the side on which the rope is hooked.

Coal in this section of the mine ranges from 4 to 6 ft in height. Haulways and aircourses are all protected by roof bolts installed on the production cycle (see p 89). The bolts support 3 to 5 ft of drawslate and coal by suspending them from a strong strata of sandstone.



Special Tool Permits Speedy Recovery of Drill Bits

ARE YOU LOSING BITS and drill steel in bolt holes? How much time have you wasted trying to recover bits and steel from drill holes? If you want an easy quick way to recover them in the future you can profit by making a tool like the one designed and used by Gus C. Stefanick, a foreman at Grant Town, W. Va. He has used the tool successfully to recover both bits and drill steel.

A piece of 1-in pipe is made into a cutting tool by filing or cutting 6 teeth on one end of the pipe. The pipe is placed in the drill hole and pushed up to the point where the bit or drill steel is stuck. Then the tool is turned clockwise to cut the packed dust or mud from around the bit. A few minutes of turning will usually remove the packed material from around the bit and release it so that it can be recovered. Mr. Stefanick reports that his device works equally well on bits and drill steel.

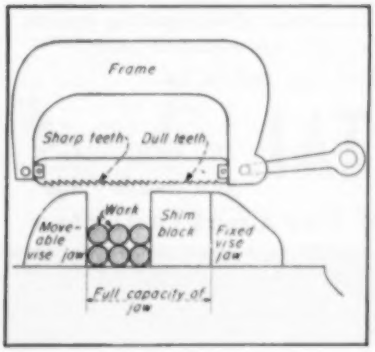
Modern Sand Handling Cuts Out Hand Labor

TWO MAN-SHIFTS PER DAY were eliminated when the Red Parrot Coal Co., Prenter, W. Va., recently modernized locomotive-sand drying and handling at its No. 3 mine. Now, the only labor required is occasional stoking of the coal-fired drier and there is never a shortage of sand in the boxes in the sections. In addition, supply men have been relieved of a job they hated—shoveling sand into the supply cars.

The new sand house is on a hillside above the No. 3½ drift, a location that is convenient for supplying the mine. Operations at the property include several widely separated areas connected by considerable outside haulage, and because of two 3% grades on the outside and 7% grades underground a tremendous quantity of sand is used.

At the sand house, the truck-dump hopper feeds into the drier through a chute with a swing-type overcut gate, and the dried sand flows downhill through a tube to a slide valve above the center of the track. The downhill tube, a 12-in spiral pipe, is 60 ft long and slopes 45 deg. Capacity of the west-sand hopper is 30 tons, while the dried-sand hopper and the tube together hold 20 tons.

Here's How to Double Hacksaw-Blade Life



WHILE EXAMINING a dozen power hacksaw blades brought into my office for sharpening, I noticed that only the first half of one of the blades was dull, writes A. F. Scoblic in a recent issue of *American Machinist*, another McGraw-Hill publication. The rest of the blade didn't even have its paint scratched, and when I looked at the other blades I found that in nearly every case only half (or less) of the blade's length was dull.

In all power hacksaws, the rear vise jaw remains stationary at all times, Mr. Scoblic continues. Thus when small pieces are cut, only a small part of the blade's length is used. With an 18-in blade length, such as ours, the saw has a width capacity of 10 in. When cutting material 5 in wide or smaller, only the first part of the blade is used.

To use the second half of the blade, it is a simple thing to "shim out" the work. Then after both sections of the blade become dull, it may be sharpened in the usual manner. We made a shim block that was easily clamped to the vise jaw. Our over-all savings add up to about 80% longer life for the blades.

DON'T HOLD BACK on any "Operating Ideas." Write: The Editor, COAL AGE, 330 West 42 St., N. Y. 36, N. Y.

in WIRE ROPE, too, survival calls for the RIGHT KIND of muscle

Powerful, constrictive muscles give the python the crushing strength that enables him to exist under the grim rules of jungle law—where only the fittest survive.

Same way with wire rope. Here again, ability to last under adverse conditions demands the right kind of muscle. Bending Fatigue . . . Shock Stress . . . Abrasion . . . Load Strain—each demands wire rope that best combines the required resistance factors to overcome the destructive forces encountered in different types of service.

Complete quality control from ore to finished rope; long experience and specialized know-how—these are your assurance that in Wickwire Rope you always get the right construction . . . the right grade of steel and size of wire for long-lasting reliable service on your particular job.

See your Wickwire Rope distributor or contact our nearest sales office.

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
THE CALIFORNIA WIRE CLOTH CORPORATION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New York • Philadelphia

WICKWIRE ROPE
A CF&I PRODUCT

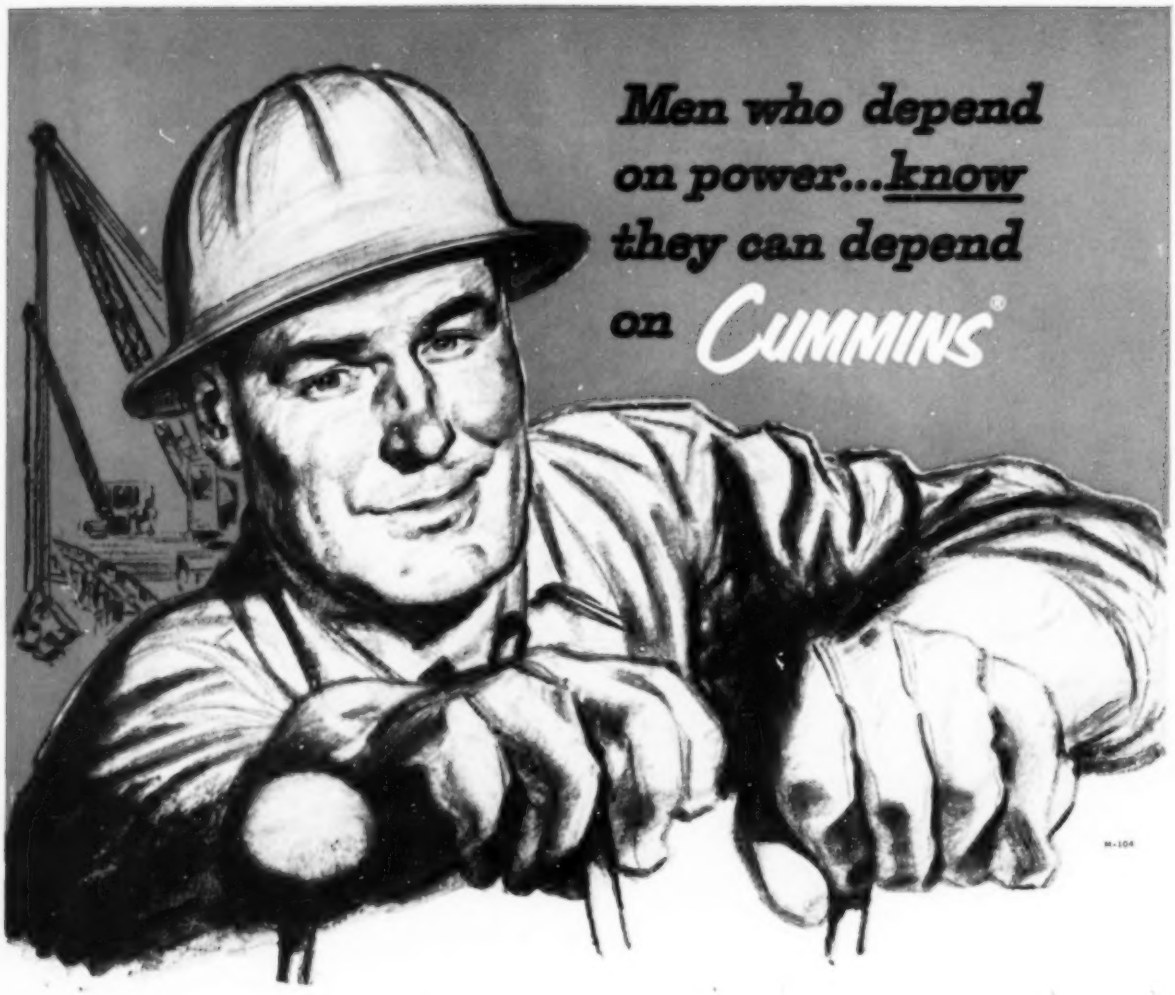
A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

WICKWIRE ROPE

CFI

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

1504



CUMMINS DIESELS *are engineered to make light work of tough jobs*

Progressive, eyes-ahead engineering is one of the big reasons why so many mine and quarry operators pick Cummins Diesels for dependability.

Consider Cummins' exclusive system of fuel injection and metering—an important factor in the unequalled performance records established by lightweight, high-speed (60-600 h.p.) Cummins Diesels. No other Diesel fuel system is so simple . . . so rugged! It delivers a uniform, properly prepared fuel charge to every cylinder. All under low pressure—no chance of bursting and leaking fuel lines.

Your Cummins dealer will be glad to tell you more about the exclusive fuel system and other engineering advantages built into every Cummins Diesel. He is an expert who knows the requirements of your job. He heads up a specialized parts and service organization—equipped to handle all your diesel power needs. Call him today . . . or write!

CUMMINS ENGINE COMPANY, INC., Columbus, Indiana
Export: Cummins Diesel Export Corporation, Columbus, Indiana, U.S.A. • Cable: CUMDIEX

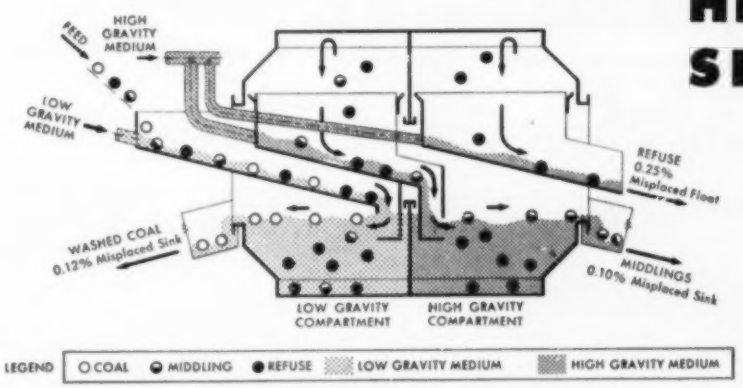
CUMMINS

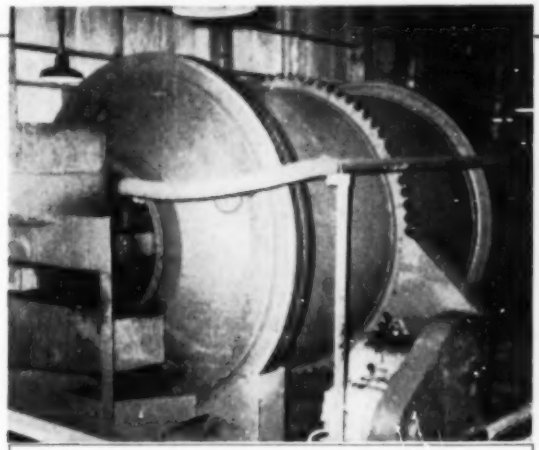
***Leaders* in rugged, lightweight, high-speed diesel power!**

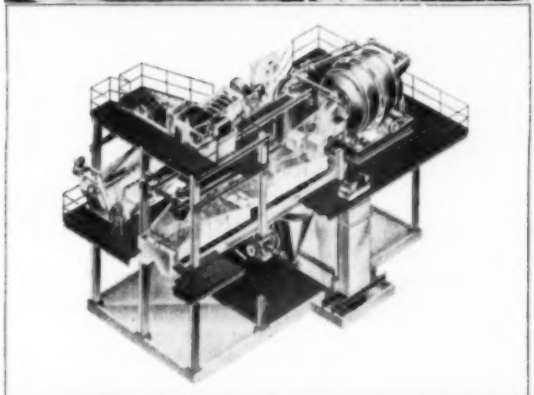
two-gravity, three-product

HEAVY-MEDIA SEPARATION

in one vessel







Here is how a Virginia operator uses the Wemco Mobil-Mill for accurate coal washing . . . with only 0.47% total misplaced material!

A prominent Virginia coal producer is now employing a Wemco Mobil-Mill for the precision cleaning of coal containing middling material. Using a No. 4C Wemco Mobil-Mill with an 8′ x 12′ Two-Compartment Drum Separator, this operator washes 114 TPH of 2½″ x ¼″ coal in the manner shown on the accompanying flow diagram.

OPERATING PRINCIPLE OF TWO-COMPARTMENT DRUM SEPARATOR

- True float coal is separated by a low gravity media in first compartment, while sink consisting of refuse and middlings passes to second compartment.
- True sink and middlings are separated by a high gravity media in second compartment.
- Both high and low gravity media remain uniform and constant in density in their respective drum compartments.
- The entire separation is accomplished within one unit.

The Wemco Mobil-Mill is a complete washing unit which provides exceptional accuracy and efficiency of separation for the consistent production of premium coal. It can be furnished in capacities up to 420 TPH and with three types of separators:

1. **WEMCO TWO-COMPARTMENT DRUM for coals having middling content requiring two-gravity, three-product separation.**
2. **WEMCO SINGLE DRUM for coals less complex.**
3. **WEMCO CONE SEPARATOR for coals in sizes up to 4″.**

PLANTS DESIGNED TO YOUR NEEDS
Through its Western-Knapp Engineering Co. Division, Wemco offers a complete design and engineering service for the construction and equipping of complete coal preparation plants, either of the Mobil-Mill or stationary types.

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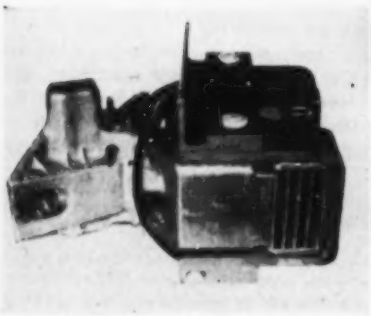
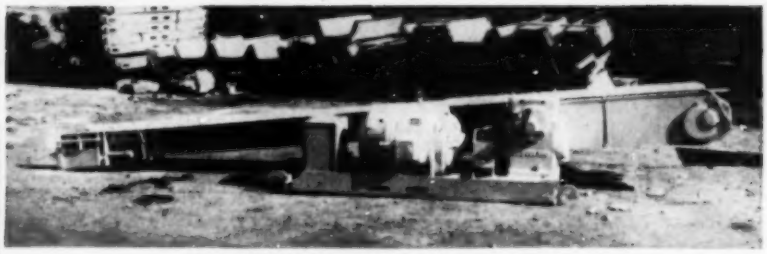
Equipment News

AMC Equipment Show Cont'd . . . begins on p 106

Joy extensible belt conveyor.



National Malleable spherical horn assembly.



Long Super Mine 400-RS chain conveyor.

ample supply of fuel and water for full shift and suited to long hauls in non-coal mines and surface work; CHD permissible carpuller especially designed to haul cars past an underground loading point.

Koppers Co., Inc., Pittsburgh 19—Ar-moored pressure-creosoted mine ties, panel grade crossings and mine timbers.

Myers-Whaley Co., Knoxville, Tenn.—NEW 184-cu-ft crawler-mounted transfer car for handling coal or ore. One 20-hp motor drives crawlers and operates the hydraulic system. Unit has rubber conveyor for unloading, and elevating discharge.

National Malleable & Steel Castings Co., Cleveland 6—National rubber-cushioned draft gears with both Willison automatic couplers and link-and-pin bumpers; lighter version of NC-1 mine-car truck for large 8-wheeled cars; Willison automatic coupler; reduced-size Willison coupler for lower-capacity cars; knuckle-type coupler; NEW rubber spring application to 4-wheel mine cars featuring high load capacity, with rubber moulded on steel plates similar to the company's pads for cushioning devices for couplers; NEW truck for 8-wheel mine cars featuring application of Westinghouse air brakes; NEW rubber-cushioned draft gears for use with link-and-pin coupler and bumper; also spherical-horn assembly for application to locomotives and heavy dropbottom cars.

National Mine Service Co., Beckley, W. Va.—NEW National Mine Service 10-ton Bureau of Mines-approved diesel locomotive, the second model approved by the Bureau for underground coal-mine operation and featuring new design improvements that facilitate control and maintenance as well as a safety exhaust with improved exhaust-gas conditioner.

Nolan Co., Bowerston, Ohio—Nolan rotary car dumper, rerailers, derailers and car blocks; Nolan Porta-Feeders, including the NEW Nolan hydraulic Porta-Feeder featuring quick and continuous movement of cars with high efficiency; easy installation and transportation, and less labor.

Ohio Brass Co., Mansfield, Ohio—O-B automatic mine-car couplers.

Sanford-Day Iron Works, Knoxville, Tenn.—10-ton automatic dropbottom mine car for 56½-in gage, sealed doors, overlapping ends, spring-mounted, outside-bearing trucks, automatic couplers; also improved tripping device and closing device for dropbottom cars.

Solvay Process Div., Allied Chemical & Dye Corp., New York 6—Calcium chloride for mine road maintenance.

W. R. Stamler Co., Paris, Ky.—NEW Stamler hydraulic car spotter, 100% self-protection, quick-moving accessories for shuttle-car and belt-loading points; NEW self-raising dollies for rapid moving of spotting unit to new loading point—minimum of 30 min for moving.

Watt Car & Wheel Co., Barnesville, Ohio—Watt mine-car design and construction; 8-wheel mine-car truck; Watt "Transman" man-trip car.

West Virginia Steel & Mfg. Co., Huntington 6, W. Va.—Mine frogs, switches, steel mine ties, switch stands, and self-contained hydraulic rail bender.

Westinghouse Electric Corp., Pittsburgh 30—15-ton gathering locomotive.

Mine Conveyors and Belting

Barber-Greene Co., Aurora, Ill.—B-G channel-frame mine conveyor; 24-in truss frame with B-G conveyor idlers, including standard, self-aligning, rubber-impact, rubber-tire and chevron-rod self-cleaning return types; other Barber-Greene mining equipment.

Boston Woven Hose & Rubber Co., Cambridge, Mass.—Full line of BWH Colliery King and Silver King conveyor belts in various types and construction,

at Mines #3 and #8 Penna. Coal & Coke Co.

Continuous Miners are used throughout these mines — and tough Kennametal U4H Bits do all the cutting. Mine officials installed them 100% after trying all available makes of carbide bits. Kennametal delivered the lowest bit cost on record: $.0110 per ton — 65% less than any other carbide bit!

Remember that ability to cut more coal is not the only reason Kennametal is used by cost-conscious mines. Savings in power output, reduced costs for resharpening and reconditioning, more efficient functioning of machines and men are all possible through proper use of Kennametal Bits. Together, they can bring about a lower cost per ton that could be important to you, in *your* mine.

Kennametal Bits consistently produce new records in cost reduction because (1) their hard Kennametal tips have shock-and wear-resistant qualities superior to any other tungsten-carbide in the industry and (2) they are sold by veteran mining men who gladly go into the mine to demonstrate the right bit for the job. Get in touch with your Kennametal Representative today!

KENNAMETAL®
KENNAMETAL INC., MINING TOOL DIVISION
BEDFORD, PA.
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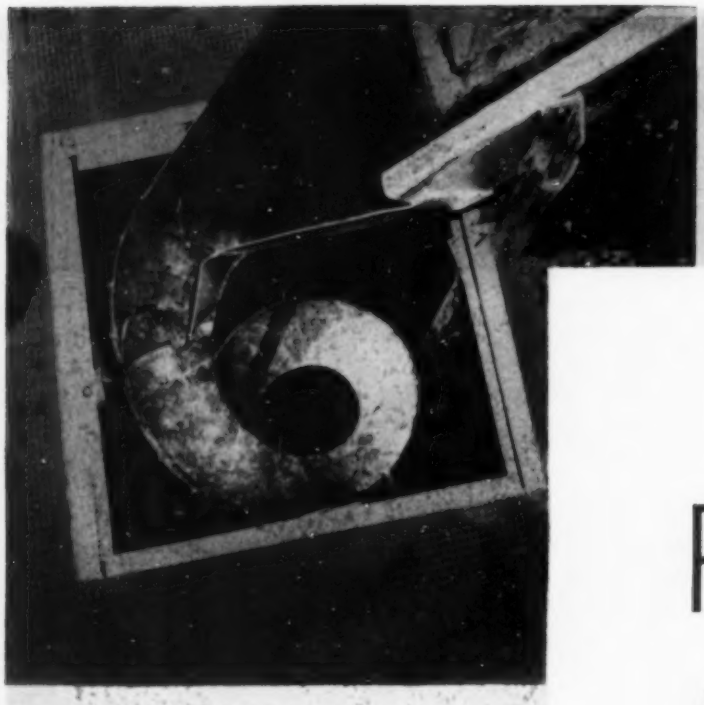
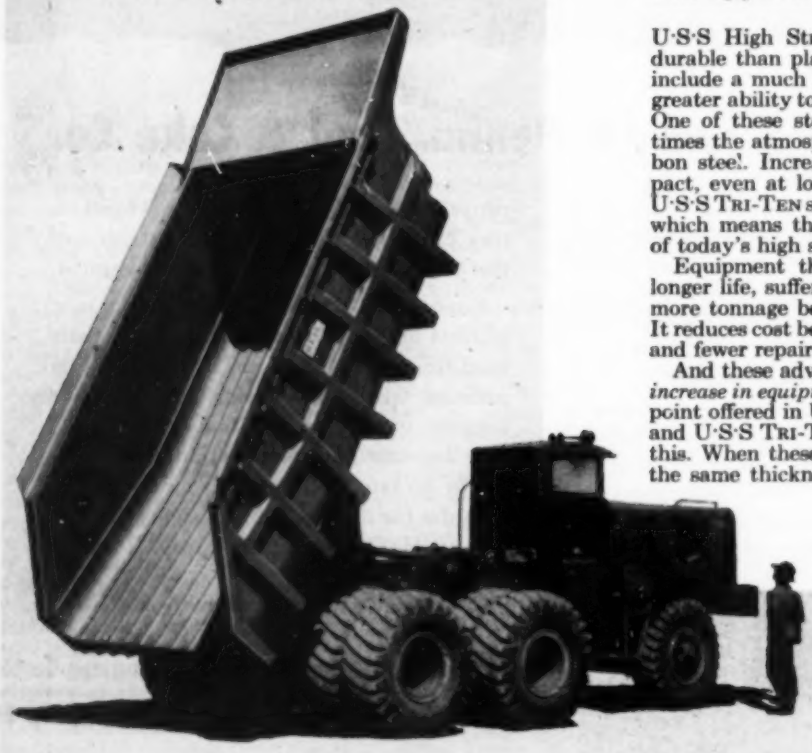
World's Largest Manufacturer of Tungsten-Carbide
Drill Bits, Cutter Bits, Roof Bits, Rock Bits, Strip Bits



LIKE MOST EQUIPMENT in a coal processing plant, a spiral lowering chute takes a lot of punishment. U·S·S Abrasion-Resisting Steel, however, used in place of carbon steel, has increased the life of such equipment two to three times.

Production UP with U·S·S High

THIS KING-SIZE HEIL dump body and hydraulic hoist can tote a 45-ton payload and dump it in 20 seconds. It is believed to be the largest truck of its kind in the world. The designers specified U·S·S MAN-TEN steel to give maximum strength to vital wear plates.



Here's the "how" and the "why" of this apparent miracle . . .

U·S·S High Strength Steels are tougher, more durable than plain steel. Their special properties include a much higher resistance to abrasion; far greater ability to withstand atmospheric corrosion. One of these steels, U·S·S COR-TEN, has 4 to 6 times the atmospheric corrosion resistance of carbon steel. Increased resistance to shock and impact, even at low temperatures is obtained with U·S·S TRI-TEN steel, and a 50 % higher yield point, which means that it can "take" the punishment of today's high speed operations.

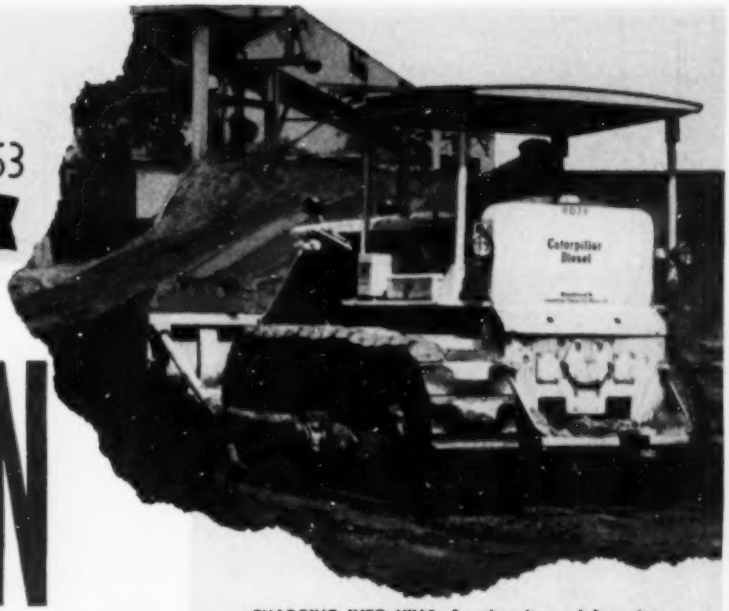
Equipment that utilizes these properties has longer life, suffers fewer breakdowns. It produces more tonnage because it stays on the job longer. It reduces cost because it requires less maintenance and fewer repair parts.

And these advantages are available *without any increase in equipment weight!* The 50% higher yield point offered in U·S·S MAN-TEN, U·S·S COR-TEN and U·S·S TRI-TEN steels provides the answer to this. When these high strength steels are used in the same thickness as plain steel, strength is in-

U·S·S COR-TEN U·S·S TRI-TEN

1933 UNITED STATES STEEL USS HIGH STRENGTH STEELS 1953

TWENTY YEARS OF PERFORMANCE



Cost DOWN with U·S·S High Strength Steels!

CHARGING INTO HILLS of anthracite coal day after day can break the back of any piece of ordinary equipment. Caterpillar Tractor Co., however, uses U·S·S TRI-TEN steel to help make its equipment rugged enough to take such abuse.

creased, yet weight remains the same. On the other hand, when these stronger steels are used in lighter sections with proper design, equipment strength may be the same as in plain steel, but with a reduction in weight.

All of this adds up to two simple, but very important facts . . . Equipment built with U·S·S High Strength Steels *does more* . . . and reduces production costs. Performance proves it . . . 20 years of performance. Introduced in 1933, these steels have been used in all phases of the mining industry. And over the years, users have reported . . . "Production *up*, costs *down* . . . thanks to your steels that do more."

We'll be glad to show you how you can use these famous steels in your equipment—how little extra they cost—and how much more you gain Phone or write our nearest office.

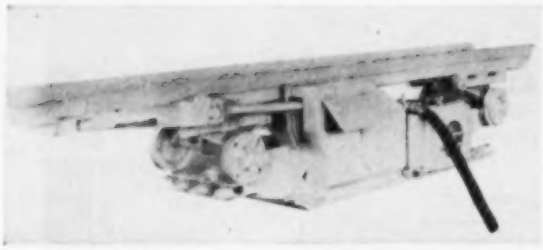
TODAY'S MINE CARS must be big; they must be rugged; yet they must be light enough to be moved easily. What's more, they must be able to withstand the corrosive conditions found in most coal mines. The modern 8-ton cars shown here meet all these requirements because they were built with U·S·S COR-TEN steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH
AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S MAN-TEN U·S·S A-R STEEL

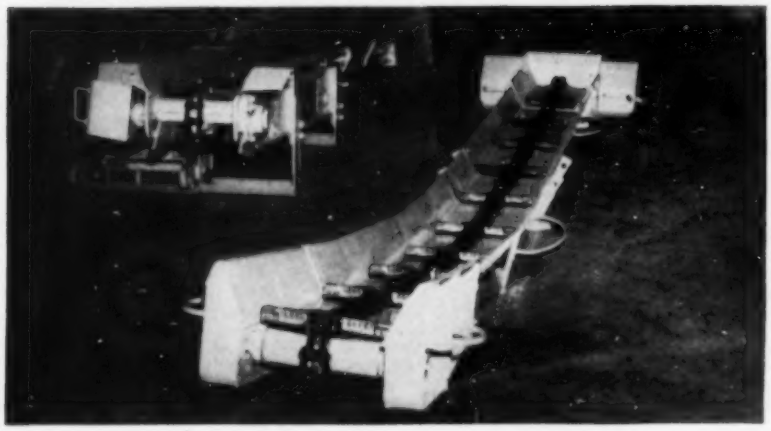
U·S·S HIGH STRENGTH STEELS USS

UNITED STATES STEEL



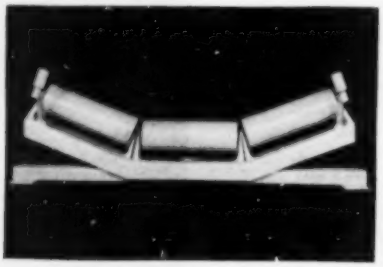
Goodman L-14 shaker-conveyor drive.

McCarthy chain conveyor (Goodman).

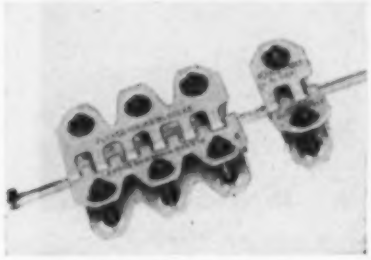


Long Super Mine 400-HL chain conveyor.

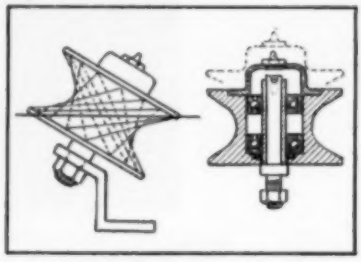
Frontier Bronze aluminum shaker conveyor.



Joy heavy-duty belt-conveyor idlers, troughing and training-troughing types.



Flexco 500X hinged belt fastener.



Knapp Mills belt-training Guidlers.

featuring full mildew-resistance and sealed-in breaker strip on top and edges for better edge wear; NEW Bulldog rayon conveyor belt available in three weights of rayon fabric for differing applications, featuring balanced construction, high troughability, low stretch, long flex life and high tear and mildew resistance.

Chain Belt Co., Milwaukee 1, Wis.—Rex and Baldwin-Rex conveyor chains, apron feeders and pans; Rex troughed-belt idlers.

Dodge Mfg. Corp., Mishawaka, Ind.—Dodge Taper-Lock solid-steel conveyor pulley.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.—Conveyor belts reinforced with du Pont "Cordura" rayon.

Flexible Steel Lacing Co., Chicago 44—Belt fasteners and tools for varied application, including NEW Flexco 500X hinged conveyor-belt fastener in a three-bolt type for easier application and increased strength, and featuring an improved flexible cable pin; NEW "Turtle" drive-on fastener for rapid simple belt repair and joining (*Coal Age*, February, p 122); NEW templet designed to simplify and speed positioning of Flexco fasteners; and newly improved belt punch for faster and easier work.

Frontier Bronze Corp., Niagara Falls, N. Y.—NEW lightweight aluminum-alloy shaker conveyor with provision for transmitting shaking forces through carrier rails in which the trough sections ride; adaptable to various drive units.

Goodman Mfg. Co., Chicago 9—Goodman Types 97, 98, 99 belt conveyors, belt rollers and other conveyor equipment, including NEW Type L-14 shaker-conveyor drive, featuring 20-in over-all height, capacity up to 500 ft of 18-in-wide 5¼-in-deep troughing, compact one-piece motor integrally mounted, new gear principle requiring fewer parts for smooth, uniform shaking motion and builtin winch to simplify moving; NEW McCarthy chain conveyor transfer unit, designed to elevate chain over cross conveyor, thus permitting pulling-up of pan line for full length of room without disturbing transfer unit or cross conveyor.

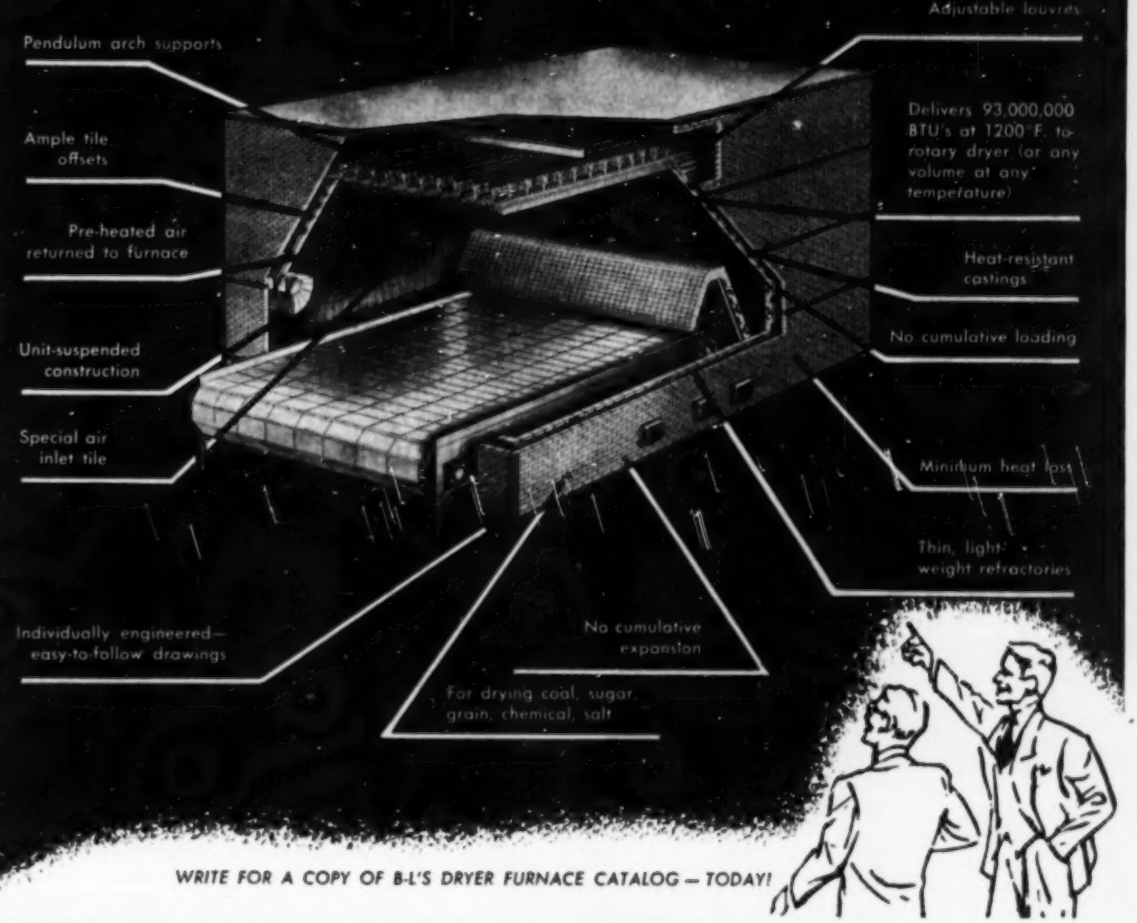
B. F. Goodrich Co., Akron, Ohio—Various types of belting for underground and surface equipment.

Goodyear Tire & Rubber Co., Akron, Ohio—Goodyear conveyor belting and other products.

Hamilton Rubber Mfg. Co., Trenton 3, N. J.—King Koal, Super Service, Rayflex, Endurance and Ideal conveyor beltings in various constructions, including a new-type Rayflex belting.

Hewitt-Robins, Inc., Stamford, Conn.—Belt conveyor idlers and other conveyor

Look at all the advantages of B-L THIN WALL *construction for Coal Dryer Furnaces*


Pendulum arch supports
Ample tile offsets
Pre-heated air returned to furnace
Unit-suspended construction
Special air inlet tile
Individually engineered—easy-to-follow drawings
Adjustable louvres
Delivers 93,000,000 BTU's at 1200° F. to rotary dryer (or any volume at any temperature)
Heat-resistant castings
No cumulative loading
Minimum heat loss
Thin, light-weight refractories
No cumulative expansion
For drying coal, sugar, grain, chemical, salt

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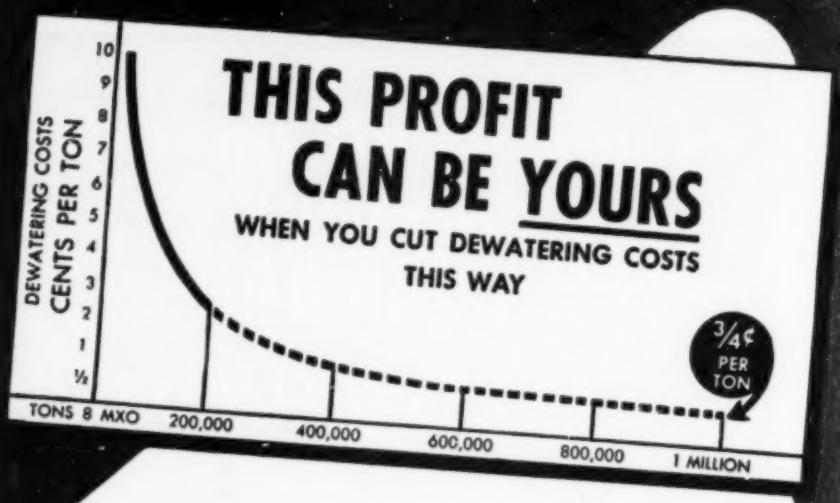
MORE PROFIT FROM YOUR FINE COAL WITH THE PETERSON TFR* FILTER



Peterson TFR* Filters in operation indicate ¾¢ per ton total maintenance cost (including screen amortization). Lubrication cost is nil – only two trunnion bearings to grease. The Peterson TFR Filter can be readily adapted to handle various size consists at power requirements depending only on the most economical moisture reduction.

A preliminary investigation of the economics of this rugged, low-cost filter for your particular conditions will be made without cost or obligation. Contact us today.

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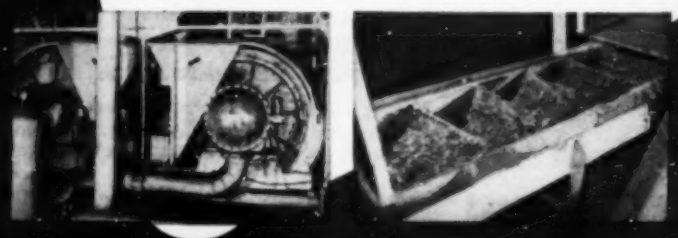


accessories, conveyor belting, hose and other rubber products for mining.

Iowa Mfg. Co., Cedar Rapids, Iowa—NEW motorized head pulley with entire power unit inside the pulley itself; troughing idlers.

Irwin Foundry & Mine Car Co., Irwin, Pa.—G40 belt conveyor and belt conveyor accessories.

Jeffrey Mfg. Co., Columbus 16, Ohio—Jeffrey equipment for conveyor mining, including belt and chain conveyors of various types, belt idlers and sections.

Joy Mfg. Co., Pittsburgh 22—Conveyor equipment, including NEW self-propelled extensible belt conveyor equipped with 24-in belt, permissible power and hydraulic drive to both head and tail chassis for use behind continuous miner; 100-ft belt storage on drive permits 50-ft. conveyor extension without additional belting and unit has coal capacity of 180 tph at standard speed, with normal maximum length 650 ft. Unit features positive belt-aligning tail section, automatic belt tensioning and safety-length limit control. Joy also showed a NEW line of belt-conveyor idlers, including heavy- and medium-duty troughing, heavy-duty self-aligning, heavy-duty impact and cable-suspension idlers.

Knapp Mills, Inc., Long Island City 1, N. Y.—Guidler, a NEW hyperbolic belt guide roller which presents a line contact to belt edges in keeping the belt trained in the troughing idlers; also slides up and down on sleeve to protect belt edge from shock.

Link-Belt Co., Chicago 1—Belt conveyors and idlers.

Long Super Mine Car Co., Oak Hill, W. Va.—Long room and gathering conveyors, Piggyback and continuous-mining systems, including the NEW PT-15 Piggyback for use in high capacity sections with heavy loading machines such as Goodman 660 and 865 and Joy 14-BU units (*Coal Age*, May p 160); NEW 400-RS high-capacity long-length heavy-duty room and gathering conveyor, featuring improved 12-in-wide chain, lightweight, easy moving and capacities up to 4 tpm; NEW 400-HL lightweight face conveyor for hand-loading with tail-end drive, featuring quick-break pan connections for easy moving through timbers and tight spots.

National Mine Service Co., Beckley, W. Va.—Hayden belt-splicing system and equipment.

Pioneer Engineering Works, Inc., Minneapolis, Minn.—Conveyor rolls and idlers, including NEW rubber impact troughing idler and rubber-disk-self-cleaning return idler with design and construction permitting heavy impact on belt without injury; and NEW self-aligning return idler featuring widely spaced and flexible disks to reduce packing and accumulation of wet sticky materials.

Quaker Rubber Corp., Philadelphia 24—Conveyor and elevator belting, including the following NEW types: "Mainliner" nylon-cotton high-tension belt primarily for tipples; "Loadliner" rayon-reinforced belting with high resistance to fastener pull-out; "Ebonite" belting, cotton-reinforced with special breaker strip for high flexibility and strength.

Gorman-Rupp 3-in diaphragm pump.

Victaulic Snap-On boltless coupling.

Brown-Fayro Surflo strainer.

Plastex marked plastic pipe.

Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.—Homocord, Ray-Man "Tension Master" and other conveyor belts, including NEW Ray-Man "F" belting for heavy-duty mine service, featuring high flexibility and troughability, increased resistance to ripping and puncturing, and high shock resilience.

W. O. & M. W. Talcott Co., Providence, R. I.—Full line of fasteners for all types of transmission and conveyor belts; Acme patch fasteners for worn or torn belts.

United States Rubber Co., New York 20—Conveyor belting and repair methods.

Pumping and Drainage

Allis-Chalmers Mfg. Co., Milwaukee 1—Pumping equipment, including 6x6 Type SF centrifugal.

American Car & Foundry Co., New York 8—ACF lubricated plug valves.

Armco Drainage & Metal Products, Inc., Middletown, Ohio—Shaped maximum-flow conduit for culverts and other drainage lines.

Boston Woven Hose & Rubber Co., Cambridge, Mass.—BWH Concord water and suction hose featuring new bright yellow and red covers to show up underground.

Brown-Fayro Co., Johnstown, Pa.—NEW Surflow foot-valve and strainer particularly adapted for mine service.

Carlon Products Corp., Cleveland 5—Carlon plastic pipe, including a NEW type for special-duty use. The new product is cheaper and has high impact strength. Carlon also displayed molded plastic fittings, including a NEW compression coupling for use on rigid plastic pipe.

Chain Belt Co., Milwaukee, Wis.—Rex Speed Primer centrifugal pumps in various sizes.

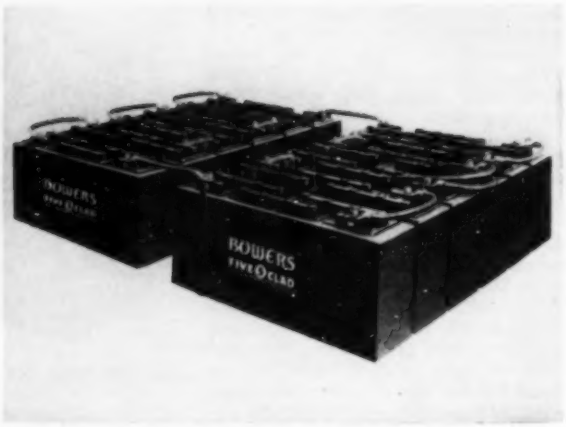
Deming Co., Salem, Ohio—Pumps and equipment, including a Fig. 1896 5x5 gathering pump with bronze water end; Fig. 3312 2-in self-priming pump with bronze water end; Fig. 4700 deepwell turbine pump; and submersible pumps and water systems designed for low-cost well installation and quiet, efficient performance.

Flood City Brass & Electric Co., Johnstown, Pa.—5-in Flood City centrifugal pump for mine service.

Frontier Bronze Co., Niagara Falls, N. Y.—NEW aluminum pipe couplings and pipe wrenches.

Gorman-Rupp Co., Mansfield, Ohio—Self-priming centrifugal pumps for gathering and sump service in various constructions to meet mine water conditions, including Model 9264-A 2-in mine pump and the engine-driven 30 Series on pneumatic mounting for strip-mine drainage; plus a NEW 3-in diaphragm pump said to offer up to 400% more pumping at 25-ft static lift, a tenfold increase in diaphragm life and a weight of only 130 lb for easy one-man handling; and a NEW Model 3168 High and Dry sump pump for applications up to 10 ft total suction lift designed for mounting above ground beside or removed from sump and con-

Exide Type TH storage battery.



Bowers Five-Clad batteries.

trolled by a floatless switch for long, trouble-free, easily maintained service life.

Gustin-Bacon Mfg. Co., Kansas City, Mo.—Rolagrip pipe couplings for plain-end pipe; Gruvagrip couplings for grooved-end pipe; Gruvagrip fittings and grooving machine.

Hamilton Rubber Mfg. Co., Trenton 3, N. J.—NEW Revelation cord-inserted suction hose available in inside diameters of 1 to 3 in, a smooth-bore hose in which the wire has been replaced by a specially treated hard twisted cord. Particularly designed for rough, abusive mine use, the hose will return to original shape within a few seconds after being crushed or run over by trucks or other machinery.

Hewitt-Robins, Inc., Stamford, Conn.—Hose and other drainage products.

Johns-Manville Sales Corp., New York 16—Corrosion resisting Transite asbestos-cement pipe and couplings.

Ohio Carbon Co., Cleveland 11—Carbon pump seals.

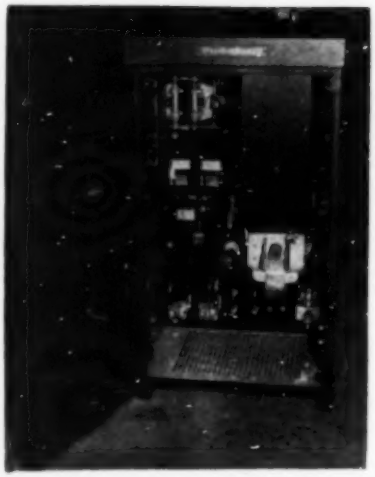
Plastex Pipe & Extrusion Co., Columbus 3—NEW Plastex yellow pipe for maximum visibility, trademarked at 10-ft intervals to facilitate measuring (*Coal Age*, January, p 128).

Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.—Ray-Man water and suction hose for mine applications.

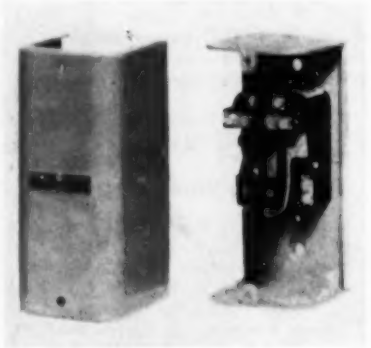
Triangle Conduit & Cable Co., Plastics Products Div., New Brunswick, N. J.—Triangle plastic pipe in four types, flexible, semi-rigid, high-impact and rigid P.V.C., available in various sizes from ½ to 6 in and featuring light weight, easy installation, corrosion resistance, and less resistance to liquid for a greater flow rate; fittings for all four types.

United States Rubber Co., New York 20—Uscolite pipe and fittings, hose, etc. NEW Uscolite valves are impervious to corrosive material and are used to replace rubber-lined valves. The new diaphram-type valve supplements the company's pinch-type.

Victaulic Co. of America, Elizabeth, N. J.—Victaulic pipe couplings and Vic-Groover pipe tools from ¾ to 60 in; Full-Flow fittings; Roust-A-Bout couplings for plain-end pipe; NEW Victaulic Snap-On boltless-type coupling in four sizes from

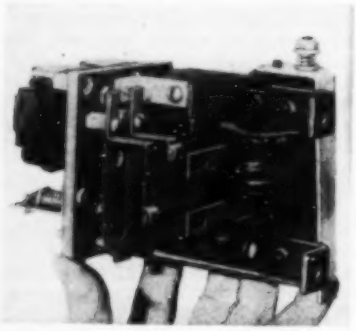


Westinghouse 1,350-amp sectionalizing switch.



G-E general-purpose relay.

1 to 4 in and designed for faster hook-ups with no loose parts in applications where speed and frequent assembly and dismantling of pipe lines are important. Installation is a one-man operation and hand pressure without bolting or tools is sufficient; also NEW Victaulic plastic insert for speedy, positive joining of flexible plastic pipe with standard Victaulic couplings without grooving or other preparation.



EC&M thermal-magnetic overload relay.

Yardley Plastics Co., Columbus 15, Ohio—Yardley plastic pipe and fittings from ¼- through 6-in sizes, in both rigid and flexible types.

Ventilation

American Brattice Cloth Corp., Warsaw, Ind.—Inflatable brattices, ventilation tubing, seven types of brattice cloth.

Bemis Bro. Bag Co., St. Louis 2—Flexipipe ventilation tubing in jute and heavy-duty grades, with rope-seam and other types of suspension; detachable and sewed-in couplings.

Fulton Bag & Cotton Mills, New York 17—F.F.F.F. jute brattice cloth; Blaze Braker brattice cloth.

Jeffrey Mfg. Co., Columbus 16, Ohio—Aerodyne 12-A58 mine fan; Aerodyne Midget blowers; and universal blowers and exhausters.

Joy Mfg. Co., Pittsburgh 22—Axivane mine fans, including high-pressure unit featuring low operating speed and wide range; Series 1000 intermediate-pressure Axivane up to 8-in water gage with adjustable blades; I-19 portable blower for moving high volumes of air through lengthy tubing; I-16 portable blower for auxiliary ventilation; and a specialized electronic fan produced for electronic-equipment cooling, 2 in in diameter, develops only 1/500-hp but revolves at 10,000 rpm.

Upson Walton Co., Cleveland — Jute brattice cloth.

Motors and Controls, Conversion Units, Batteries

Allis-Chalmers Mfg. Co., General Machinery Div., Milwaukee 1—Motors, controls.

Bowers Battery & Spark Plug Co., Reading, Pa. — Bowers mine-locomotive and shuttle-car batteries, featuring five-clad insulation of the positive plate with specially-developed active material to perform under this insulation.

Coal Mine Equipment Sales Co., Terre Haute, Ind.—Rebuilt substation equipment, including rectifiers, rotary converters and m-g sets.

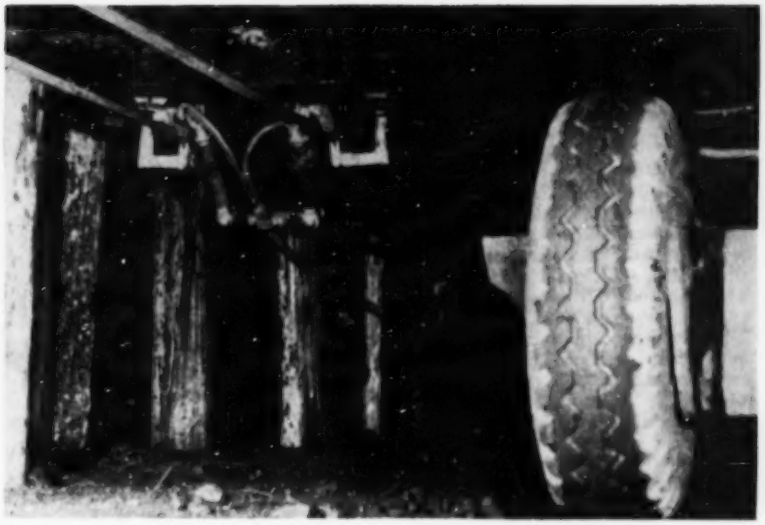
Electric Controller & Mfg. Co., Cleveland 4—NEW Type ZTM thermal-magnetic overload relays for protecting AC motors; also Line-Arc automatic-reclosing sectionalizing breakers for stub ends; frequency relay for reversing and non-reversing aerial tramways; wound-rotor motors; Tab-Weld resistors; and the WB electric brake.

Electric Storage Battery Co., Philadelphia—NEW "TH" (thrifty hauler) line of Exide-Ironclad batteries, 20% more capacity with no size increase, and featuring polyethylene slotted tubes to hold the active material, polyethylene tube sealers, corrosion-resisting silvium in the grids, Pormax flexible separators, new sealing compounds and seamless rubber jars.

Ensign Electric & Mfg. Co., Huntington 4, W. Va.—AC and DC mine-control equipment, with NEMA-1 and explosion-tested enclosures; dusttight and permissible mine power-distribution boxes; centrifugal switches for belt control and sequence operation; Ensigneer safety control for underground belts; NEW Ensign-Clark Type ADJR starter, Bureau of Mines explosion-tested, designed for 2-speed conveyor-belt motor and offering special features, such as, speed-up and remote control for shuttle-car loading (*Coal Age*, February, 1952, p 125); NEW Bulletin 1101 centrifugal switch with explosion-tested enclosure for AC or DC, which can be added to present installations to automatically protect belt from damage by stopping motor when belt jams or slips; NEW Ensign mine power distribution system providing an approved means of sectionalizing power cable between power source and face equipment, utilizing a new relay in the entry box to provide an intrinsically safe circuit, Ensign lever-action line connectors with all parts renewable, dusttight or permissible entry box, and ground-current limiter attachments to protect both power and trailing cables.

Farmers Engineering & Mfg. Co., Irwin, Pa.—NEW Femco remote Telemetering measuring and recording systems applicable to wide range of factors such as pressure, liquid level and flow, AC and DC voltage and current, pump control and indication, etc.; and NEW Femco system of "Supervisory Control" for remote indication and control of substations and fan and pump equipment, for example.

Flood City Brass & Electric Co., Johnstown, Pa.—Electrical switches.



Elreco double-inverted trolley system and "Slook."

General Electric Co., Schenectady, N. Y.—NEW 50-kw selenium rectifier; NEW ewf standardized mine-locomotive accelerating and braking resistors; DC mine motors with BM control; and electrical equipment for preparation plants, shovels and draglines, including Amplidyne.

Goodman Mfg. Co., Chicago 9—Controllers and safety switches.

Gould-National Batteries, Inc., Trenton 7 — Mining batteries, component parts.

I-T-E Circuit Breaker Co., Philadelphia 30—Type KSC automatic reclosing circuit breaker featuring a new-design 3-door enclosure with improved support at the corners for greater rigidity, and three easily opened doors for ready access in maintenance; also methods of sectionalizing underground DC power distribution, using automatic reclosing circuit breakers according to the recently released USBM recommendations.

Joy Mfg. Co., Pittsburgh 22—Joy SCC safety circuit centers providing circuit-breaker and ground-fault-trip protection in an intrinsically safe circuit in dusttight and permissible types for supplying one to four mobile mining machines, and in dust- and water-resistant type for strip-mine application; Joy Magnetax control featuring new molded-plastic operating coil and new sealed mercury switch with built-in terminals.

Lewis Electrical Mfg. Co., New York—55-kw and 150-kw selenium rectifiers and the new-type 300-kw 275-v DC mine-type selenium rectifier (*Coal Age*, May, 1953).

National Mine Service Co., Beckley, W. Va.—Bemeco controllers.

Ohio Brass Co., Mansfield, Ohio—O-B mine motor starters and distribution boxes.

Post-Glover Electric Co., Cincinnati 2—Transfer switches, mining-machine resistors, locomotive resistors, magnetic contactors for reel motors.

Reliance Electric & Engineering Co., Cleveland 10—AC and DC motors, including designs providing doubled horsepower in the same frame dimensions.

Schroeder Bros., Pittsburgh 1—Schroeder Bros. conveyor-control switches.

Syntron Co., Homer City, Pa.—Packaged heavy-capacity AC-DC power-conversion units, consisting of Syntron selenium-rectifier stacks providing a range of DC power up to 550 v.

Westinghouse Electric Corp., Pittsburgh 30—Complete line of AC and DC mining motors and controls; Types AB and ABI breakers; NEW 1,350-amp sectionalizing switch featuring knife-edge bearings, quick-quench arc, control of hot gases and simple maintenance; NEW-design self-contained portable Ignitron rectifier.

Electrical Wires, Cables, Bonds and Specialties

Anaconda Wire & Cable Co., New York 4—Mining wires and cables—trailer, shotfiring, shovel, telephone, and control, including a NEW-design shuttle-car trailing cable.

Boston Woven Hose & Rubber Co., Cambridge, Mass.—Bull Dog tapes, featuring the NEW Bull Dog plastic electrical tape containing a pressure-sensitive compound and said to be resistant to weather, corrosive chemicals, water, oils and abrasion. The extra-thin tape has high tensile strength and adhesive qualities, and reportedly may relace conventional friction tape and splicing compounds.

Burndy Engineering Co., Inc., Norwalk, Conn.—Burndy solderless connectors, including mechanical cast connectors and mechanically pressed connectors for on-the-job installation.

Elreco Corp., Cincinnati 25—Elreco smooth-underrun frogs and splicers, J-hooks, standard and heavy-duty trolley sliders and other line material, including: NEW Type S-U smooth-underrun frog especially designed for arc-free operation in uninterrupted haulage at high speeds,

with the slider gliding on the frog tongues without contacting the frog pan and thus eliminating damaging cutting and wear on the pan; NEW Type S-U smooth-underrun trolley-wire splicer for grooved and Sec. 9 or Fig. 8 wire, designed to hold arcing and splicer wear to a minimum and specially recommended by the maker for high-speed operation and permanent installation; NEW Elreco "Double-Inverted" trolley "slook" and trolley system for operation of rubber-tired mine vehicles of all types. An adaptation of the Elreco inverted trolley system employing the flexible 2-wire slook current collector, the double-inverted system is said to offer complete freedom of operation without requiring the driver's attention, efficient use of rubber-tired units in high or low coal, forward or reverse travel to and beyond end of trolley line without costly delays, and elimination of costly cable installation and repairs. The system reportedly is easy to install and requires no special maintenance.

Ensign Electric & Mfg. Co., Huntington, W. Va.—Ensign rail bonds and cable connectors.

Flood City Brass & Electric Co., Johnstown, Pa.—Flood City trolley wheels and trolley-line materials.

General Cable Corp., New York 17—Safety Mineral Insulated wire, a unit-type conduit system consisting of copper wire surrounded by mineral insulation and magnesium oxide within an over-all copper sheath eliminating the need for pulling wires through conduit and said to last for entire life of the structure.

General Electric Co., Schenectady, N. Y.—Wiring and cable for coal-mine service.

General Equipment & Mfg. Co., Louisville 6—Gemco cable faultfinder, a simply operated low-cost unit for locating shorts or open circuits.

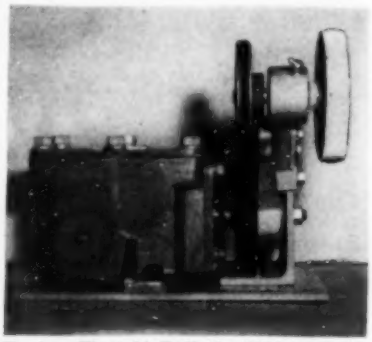
Hazard Insulated Wire Works, Div. Okonite Co., Wilkes-Barre, Pa.—All types of wires and cables; Hazaprene sheathed portable Hazacord cables; NEW Hazacord Hazaprene ZBF sheathed twin mining-machine cable with new "Hex-Tite" construction for longer life; newly designed cables for the Carbide miner, featuring AC, DC and electronic control wires all in one cable.

Helwig Co., Milwaukee 10, Wis.—NEW MultiFlex brushes with neoprene pads to protect brushes against chatter damage; carbon brushes; carbon contacts.

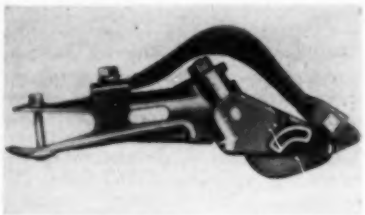
Insulation & Wires, Inc., St. Louis 3—NEW Ideal voltage tester for use on circuits from 110 to 550 v, AC, 25 or 60 cycle, or 110 to 600 v, DC, to test nominal voltage, circuit continuity, hot lines, grounds and so on; Thermo-Grip soldering sets; silicone insulation; other motor-maintenance tools and replacement parts.

John A. Roebling's Sons Corp., subsidiary Colorado Fuel & Iron Corp., Trenton 2, N. J.—Electrical wire and cable, including NEW Roebling Roeplastic control cable designed for remote control of equipment, circuits and controls with installation in conduit, direct in earth, in underground ducts, or in open air. The cable provides up to 26 stranded copper conductors Amaloy-coated, with color

Boston Woven Hose plastic electrical tape.



Ensign Electric Bulletin 1101 centrifugal belt switch



Ohio Brass collector shoe for large-size locomotives.

code and conductor number indelibly printed, encased in a Roeplastic protective sheath.

Johns-Manville Sales Corp., New York 16—Johns-Manville insulating tapes; fireproof insulating panels for switchboard mountings.

Joy Mfg. Co., Pittsburgh 22—Joy "Molded-to-Cable" electrical connectors, cable vulcanizers, etc., including NEW attachable-style permissible magnetic-lock splice box designed to facilitate sectionalizing of portable cables, permitting use of only required length for better delivered voltage and speedy installation, with operation of splice box controlled by a magnet key kept by an authorized person; also NEW Joy cable fault finder, a self-contained sturdily constructed battery-powered unit weighing only 23 lb and designed primarily to locate open conductors and low- and high-resistance shorts (to 10,000 ohms) in neoprene- or rubber-jacketed cables.

National Mine Service Co., Beckley, W. Va.—Trolley-wire splicers, and National Mine's NEW "Safe-Cable" rebuilding service available on a pick-up and delivery basis from a number of divisions, said to provide spliced sections of original-cable diameter with more than 90% of tensile strength and full flexibility of unspliced cable, plus testing and repair of jacket-concealed injuries to unspliced sections of the cable.

Ohio Carbon Co., Cleveland 11—Full line of carbon brushes and metal-graphite brushes for rotating equipment.

Oliver Iron & Steel Corp., Pittsburgh 3—Complete line of pole-line hardware.

Ohio Brass Co., Mansfield, Ohio—Complete line of O-B smooth-underrun trolley and feeder materials, current collectors and rail bonds, including a NEW current-collector shoe for large-size locomotives using over 2,000 amp. and a complete line of NEW fittings for aluminum underground cable.

Penn Machine Co., Johnstown, Pa.—"Super-Weld" and "Everlast Super-Weld" rail bonds.

Rome Cable Corp., Rome, N. Y.—Rome 60 cables, featuring shuttle-car types, including the NEW Rome 60, specification 1065, incorporating flexibility and mechanical protection against failure of frame-ground wire. Small diameter provides maximum reel capacity.

Simplex Wire & Cable Co., Cambridge, Mass.—Mining cables and cord, featuring Tirex "Geared-Type" twin shuttle-car and mining-machine cables; Tirex portable cords and cables; and Anhydrex cables for ground duct and overhead installation.

Superior Carbon Products, Inc., Cleveland 5—Carbon-graphite, electrographitic-graphite, metal-graphite and silver-graphite brushes for heavy-duty use on motors, generators, etc.; silver-graphite and silver-alloy contacts for all controls; refacing with silver or wornout or burned copper contacts on controller fingers for lower maintenance and fewer shutdowns.

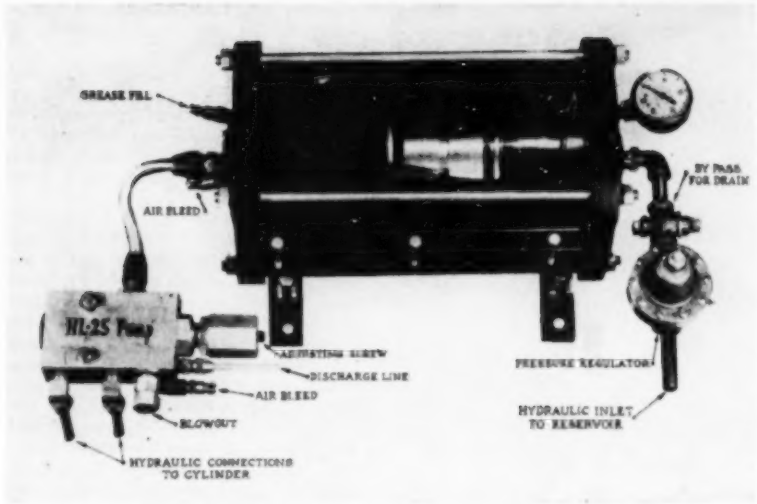
United States Rubber Co., New York 20—Full line Royal portable cords; Royal portable cables; Royal shielded portable cables; Royal welding, borehole and mining power cable; telephone cables, lamp cord, blasting wires, power and lighting wires; Uscolite cable-splicing housing; and NEW Royalastic vinyl tape featuring high dielectric strength, moisture resistance and greater mechanical strength.

United States Steel Corp. subsidiaries, Pittsburgh 30—Electrical cables.

Van Cleef Bros., Inc., Chicago 19—Dutch Brand insulating tapes consisting of friction, rubber insulating and plastic electrical tapes; and NEW Dutch Brand DB wire connectors in four sizes, said to provide an insulated splice with a twist of the fingers, without tools or solder, resisting vibration, pull-out and effects of weather.

Power Transmission

Aeroquip Corp., Jackson, Mich.—Aeroquip flexible hose, self-sealing couplings and detachable reusable fittings for both original-equipment manufacture and for installation on all types of coal-mining



Trabon Hyra-Lube hydraulic reservoir assembly.

machinery, including NEW Slide-Seal coupling which permits speedy, simple connection and disconnection of fluid-carrying lines by an easy push-pull action without tools (*Coal Age*, May, p 164).

Allis-Chalmers Mfg. Co., General Machinery Div., Milwaukee 1—Texrope drives.

Boston Woven Hose & Rubber Co., Cambridge, Mass.—BWH belting and V-belts, featuring machine-matching of V-belts offered in packaged sets factory sealed.

Chain Belt Co., Milwaukee 1, Wis.—Rex and Baldwin-Rex power-transmission chains.

Cleveland Worm & Gear Co., Cleveland 4—Fan-cooled Speedaire reduction unit, Model 300-FA.

Dodge Mfg. Corp., Mishawaka, Ind.—Full line of Dodge power-transmission equipment, including Taper-Lock V-belt sheaves; Taper-Lock flexible and rigid couplings; Dodge Torque-Arm speed reducer and Tri-Matic overload release; NEW Taper-Lock sprockets for roller chain; and NEW Dodge roller chain, both available from distributors stocks in a wide range of sizes and designed to eliminate costly and time-consuming boring of shafts to fit sprockets (*Coal Age*, April, p 121).

Foote Bros. Gear & Machine Corp., Chicago 9—NEW centrifugal clutch; in-line and parallel-shaft gearmotors; worm gears and speed reducers.

Link-Belt Co., Chicago 1—Chains and anti-friction bearings.

Oliver Iron & Steel Corp., Pittsburgh 3—Berry hydraulic pumps, fluid motors and transmissions.

Parker Appliance Co., Cleveland 12—Triple-lok flared and Ferrulok flareless tube fittings and directional control valves for hydraulic systems; powered tube flarer to insure leakproof joints for high-pressure systems.

S. K. Wellman Co., Bedford, Ohio—All-metal Velvetouch clutch plates, facings and brake linings, including Velvetouch matched sets for heavy duty; also friction parts for tractors, trucks and strip-mining units.

Twin Disc Clutch Co., Racine, Wis.—Small aluminum hydraulic couplings; Model CL industrial clutch; multiple-disk clutches; engine power takeoff; Hydro-sheave hydraulic coupling for mounting on electric motors and small internal-combustion engines; Model EH industrial heavy-duty clutch; Model P air-actuated clutch; NEW two-stage hydraulic torque converter offering new converter performance to fill the gap in industrial hydraulic drives; NEW two-speed transmission to extend performance of three-stage converter; NEW disconnecting hydraulic power take-off reduces impact shocks 70%; NEW air-actuated friction clutch features compactness and greater torque capacity.

United States Rubber Co., New York—Transmission belts.

Westinghouse Electric Corp., Pittsburgh 30—Speed reducers and gearmotors.

Bearings

Ahlberg Bearing Co., Chicago—Full line of ball bearings and pillow blocks.

Bearing Service Co., Pittsburgh 13—New Replacement bearings for dewatering centrifuges; full line of ball and roller bearings; antifriction-bearing appliances.

Dodge Mfg. Corp., Mishawaka, Ind.—Complete line of Dodge-Timken pillow blocks including NEW "All-Steel" units.

Helwig Co., Milwaukee 10, Wis.—Carbon bearings and seals.

Link-Belt Co., Chicago 1—Link-Belt antifriction bearings.

National Mine Service Co., Beckley, W. Va.—Ball bearings.

Ohio Carbon Co., Cleveland 11—Carbon bearings for mechanical applications.

SKF Industries, Inc., Philadelphia 32—Full line of SKF antifriction bearings and pillow blocks, featuring: newly improved spherical roller bearings available in an increasingly wider range of sizes, with a new-design inner race, roller and cage, completely eliminating the flange on each end of the inner race and providing in the same space more bearing capacity for better performance and longer life, also SY pillow blocks with Fairprene seal and flingers to exclude dust, and triple-sealing easily assembled SAF pillow blocks.

Timken Roller Bearing Co., Canton 6, Ohio—Full line of Timken bearings for mine cars and other mining machinery, including NEW Timken tapered-bore roller bearings with spherical outer races to make them fully self-aligning, for shafts from 2 15/16 to 10 in in diameter.

Wire Rope and Steel Products

American Chain & Cable Co., American Cable and Hazard Wire Rope Divs., Wilkes-Barre, Pa.—Green Strand preformed wire rope, Acco-Registered wire-rope slings; NEW Acco-Registered Dualoc boom assemblies for use as back stays, sway braces, boom supports and boom extenders.

Armco Drainage & Metal Products, Inc., Middletown, Ohio—Metal retaining walls and complete line of Armco steel buildings.

Bethlehem Steel Co., Bethlehem, Pa.—Wire rope for underground and surface use.

Broderick & Bascom Rope Co., St. Louis 15—Yellow Strand wire rope and braided wire-rope slings.

Colorado Fuel & Iron Corp., Wickwire-Spencer Steel Div., New York 22—Complete line of wire rope fittings and slings.

Hendrick Mfg. Co., Carbondale, Pa.—Open steel-flooring for various applications.

Jones & Laughlin Steel Co., Pittsburgh—Full line of wire rope; Jalloy and Otiscoloy steels for industrial applications.

A. Leschen & Sons Rope Co., St. Louis 12—Hercules Red Strand wire rope, including 3-in drag rope; wire-rope slings.

Macwhyte Co., Kenosha, Wis.—Macwhyte wire rope; round and flat braided wire-rope slings; custom-built slings and "Safe-Lock" wire-rope assemblies; and varied wire-rope machine parts with assorted fittings permanently attached.

John A. Roebling's Sons Corp., subsidiary of Colorado Fuel & Iron Corp., Trenton 2, N. J.—Roebling wire rope, rope slings and fittings.

Union Wire Rope Co., Kansas City 26, Mo.—"Tuffy" wire-rope products including dragline, scraper and slusher ropes, slings, dozer, choker and mining-machine ropes.

United States Steel Corp., subsidiaries, Pittsburgh 30—Alloy and high-strength steel; Tiger Brand wire rope.

Upson Walton Co., Cleveland—Swing ropes with swaged fittings for mining machines; wire rope, rope fittings and tackle blocks.

Lubrication

Alemite Div., Stewart-Warner Corp., Chicago 14—Alemite "Oil-Mist" lubricating systems; "Accumeter" automatic centralized lubricating systems; "Versatal" materials-handling pumps; Alemite mine-car gun; hand guns and fittings; also, pole gun for use with Versatal pump

fn spraying roofing materials, waterproofing compounds and so on.

Ashland Oil & Refining Co., Ashland, Ky.—Complete line of Ashland and Valvoline mine and industrial lubricants.

Cities Service Oil, Inc., New York 5—Specially processed oils for mining.

D-A Lubricant Co., Indianapolis—Heavy-duty oils and lubricants in different-colored drums for each type lubricant.

Farval Corp., Cleveland 4—Farval automatic centralized-lubricating equipment and accessories.

Gulf Oil Corp., Pittsburgh 30—Gulf multiuse lubricant for use at the working face.

Knapp Mills, Inc., Long Island City 1, N. Y.—Lead-Lube for open gears and bearings, exposed and enclosed chains, and all types of wire rope and cables.

Lincoln Engineering Co., St. Louis 20—CentrOmatic and Hydra-Luber automatic centralized lubrication systems for mining machinery and plants; and a wide range of lubricating equipment and accessories, including new-design MD-31 balanced-power automatically controlled pump with automatic Pressure-Flo equalizer and hose assembly for dispensing materials ranging from fibrous insulating compounds to rust and corrosion preventatives, including spraying compounds for mine-roof coating, utilizing a spray head, pole or flow guns; NEW "Man-Size" grease guns holding 21 to 32 oz of lubricant (*Coal Age*, May, p 164); and NEW Lok-Tite reusable hose couplings featuring fast, easy assembly, and positive leakproof performance.

Pure Oil Co., Columbus, Ohio—High-quality mining machine lubricants and tires for on-highway vehicles.

Shell Oil Co., New York 20—Rotella extra-heavy-duty oil, Tellus hydraulic oil, Alvania multipurpose grease, Simnia gear lubricant, Rimula oil and general industrial lubricants; also, TCP, new gasoline additive.

Socony-Vacuum Oil Co., New York—Planned lubrication, four-step preventive maintenance plan.

Standard Oil Co. (Ind.), Chicago 80—Effective mining lubrication.

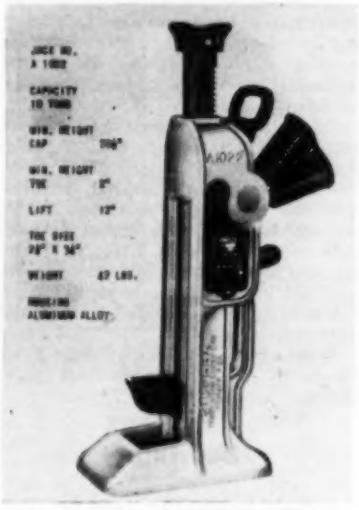
Standard Oil Co. (Ohio), Cleveland 15—Mining oils and greases, diesel fuels.

Texas Co., New York 17—Texaco lubricants and engineering service.

Tide Water Associated Oil Co., New York 4—Engineered lubrication for mining applications, featuring Tycol industrial lubricants and Veedol automotive oil and greases.

Trabon Engineering Corp., Cleveland 3—Fully automatic lubrication systems for preparation units, such as, crushers, screens, conveyors, etc., including the NEW "Meterflo" oil-circulating system providing positive, signal-indicating control of oil flow to every bearing under pressure (*Coal Age*, April, p 121); plus completely automatic lubrication systems for shuttle cars and loaders utilizing the Hydra-Lube hydraulically powered pumping unit featuring a NEW hydraulically loaded lubricant reservoir which, by elimination of conventional springs on follower, permits handling a larger charge of lubricant in the same space and also greatly simplifies maintenance of the unit.

Harnischfeger Zip-Lift electric hoist with rope control.



Simplex 10-ton aluminum-housing ratchet lowering jack.

New and Renewal Parts

Chain Belt Co., Milwaukee 1, Wis.—Rex and Baldwin-Rex conveyor chains.

Clarkson Mfg. Co., Nashville, Ill.—NEW Clarkson Hevi-Duty Redbird conveyor chain for most loading machines and continuous miners.

Flood City Brass & Electric Co., Johnstown, Pa.—Flood City locomotive headlights and various locomotive and machine-repair parts, including NEW brass bushings for cutting machines.

Goodman Mfg. Co., Chicago 9—Goodman supply parts, such as chain sections, belt rollers, wobble gears, dimpled shaker-trough sections, headlights and hydraulic power braking assembly for installation as a packaged unit on most mine locomotives, single or tandem, regardless of size, to provide easily operated, quick, positive braking.

Jeffrey Mfg. Co., Columbus 16, Ohio—Jeffrey chains and renewal parts for all equipment.

Joy Mfg. Co., Pittsburgh 22—Joy engineered electrical and mechanical parts, such as chains and flights, gears, a NEW universal wheel drive unit, improved 40J commutator, and new-style brush rigging with preset tension and molded brush box.

Kensington Steel Co., Chicago 28—Oro manganese-steel parts, such as, dragline bucket chain; loader treads and teeth; tractor rail and grousers; rivetless, wash-box and refuse chain; and renewable-tooth sprockets; featuring NEW dragline bucket-chain repair links suitable for use with all standard manganese chains, designed with each half-link identical for higher strength and using self-peening wedge for easy assembly in field; also NEW all manganese-steel tractor rail and grouser, reportedly the first all-manganese-steel units made, which offer reduced maintenance and less down time through greatly increased wearing life.

Link-Belt Co., Chicago 1—Link-Belt chain for mining applications.

Mining Machine Parts, Inc., Cleveland 14—Gearing, sprockets and renewable-rim sprockets; NEW MMP square-head-rivet crawler chains for 11-BU loader; conveyor and drive chains; clutch disks; high-torque drive shafts and axles; and other MMP improved replacement parts.

National Electric Coil Co., Columbus 16, Ohio—Winding services and techniques producing improved National Electric coils for motors and generators.

National Mine Service Co., Beckley, W. Va.—Bemeco cable reels, intermediate gears, brush holders, cable guides, journal boxes, armature and field coils, Locolite sealed-beam headlights, and replacement parts for mining equipment.

Page Engineering Co., Chicago 38—Page reversible center shank dragline teeth, chain and castings.

Penn Machine Co., Johnstown, Pa.—High-quality replacement parts for all late-model mine locomotives, mining and loading machines, and continuous-mining units.

Schroeder Bros., Pittsburgh 1—Schroeder locomotive headlights and hydraulic pumps, motors and valves for general application.

Tool Steel Gear & Pinion Co., Cincinnati 16—Cross-sectioned samples of hardened gears, pinions, sprockets, sheave wheels, shafts and other new and renewal parts.

Bertrand P. Tracy Co., Pittsburgh—Gears, pinions and other replacement parts for mining machinery, including line of Joy machinery parts.

West Virginia Armature Co., Bluefield, W. Va.—Armature and field coils for all mining equipment; locomotive journal and axle linings and other parts.

Wilmot Engineering Co., Hazleton, Pa.—Keystone rivetless chain and chain attachments, in drop-forged steel, alloy or cast chrome-manganese.

Maintenance

American Brake Shoe Co., American Manganese Steel Div., Chicago Heights—Castings of "the toughest steel known,"

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Whatever your fuel needs, we have a coal that is

Just the Ticket!

● In fact, you can write *your own* ticket—for the vast Bituminous fields served by the Baltimore & Ohio contain excellent coals *in wide variety*. For centuries to come, these coals will be available—a dependable source of low-cost heat and energy.

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ASK OUR MAN! He can give you worthwhile advice as to supply sources and burning methods for the particular coal you need. The efficiency, economy, and cleanliness of B&O Bituminous today will be a revelation!

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Watch the operator change through the full range of blade positions in one minute without leaving his seat! Get into the seat yourself! Notice how the operator has a full view of his work without standing up. Check the steady production with no stops for adjustment.

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Postage Will Be Paid By—
McGRAW-HILL PUBLISHING CO., INC.
THE EDITOR, COAL AGE
330 WEST 42nd STREET
NEW YORK 36, N. Y.

Ind. — SuperDuty Diagonal-Deck coal-washing table; Concenco antifriction-bearing head motion; Concenco 108 distributor; Concenco J-132 and J-136 spray nozzles; and NEW Leahy vibrating screen with FlexFlex cloth-heating unit.

Deister Machine Co., Ft. Wayne, Ind. — Newly improved coal-washing table incorporating the new "Lifetime Anti-friction Headmotion" and other design features offering high efficiencies and broader range in cleaning coal fines (*Coal Age*, Sept., 1952); also Deister electric screen-heating units for better screen performance.

Denver Equipment Co., Denver — Complete coal-flotation plant in operation; NEW packaged "Sub-A" coal-flotation plant designed particularly for small-scale operations and recovering coal from isolated areas, stockpiles, etc.; newly improved Denver automatic sampler, featuring roller carriage for longer motor and bearing life; Denver vertical sand pump; Denver SRL sand pump.

Dings Magnetic Separator Co., Milwaukee, Wis. — Rectangular suspended tramp-iron magnet and magnetic extractor for removing broken steel from drill holes.

Dorr Co., Stamford, Conn. — NEW Dorrclone for recovering coal fines with special-material liner to cut down wear inside Dorrclone and apex valve. Exhibited liner has 900 hr service and will be returned to Robena mine for destruction test.

Fairmont Machinery Co., Fairmont, W. Va. — Coal-preparation engineering and construction services.

Fuel Process Co., S. Charleston 3, W. Va. — Belknap calcium-chloride coal-washing equipment.

F. R. Hannon & Sons, Canton 7, Ohio —Electrically-heated screen with direct electrical contact to screen cloth; equipment for electrically heating all makes of screens.

Hendrick Mfg. Co., Carbondale, Pa.— Complete line of late-type screens, including round and square perforated flat screens and flanged lip screens, featuring NEW 10-A and 15-A Wedge Slot screens designed for processing fine materials and using stainless-steel bars with V-shaped profile much smaller than previously used, and providing at least double the open area of other types of dewatering screens, according to the maker.

Hewitt-Robins, Inc., Stamford, Conn. —Gyrex screen with Hewitt-Robins Hannon cloth heater; full-size shuttle-belt conveyor; screen cloth.

Heyl & Patterson, Inc., Pittsburgh 22 —Standard 8- and 14-in Cyclone thickners; Reineveld centrifugal coal drier; NEW H & P 8-in Cyclone with water-injection for high efficiency.

Interstate Equipment Div., Yara Engineering Corp., Elizabeth 4, N. J.— Aerial tramway systems, including a full size 40-cu-ft tramcar mounted for use and tramways up to 500 tph capacity; also, self-dumping reversible tramways.

Iowa Mfg. Co., Cedar Rapids, Iowa— Double-impeller impact breaker designed primarily for high reduction in a single stage by using rebound material to break incoming material.

Jeffrey Mfg. Co., Columbus 16—Jeffrey Baum-type jig; double-roll crushers, including a 30x36-in unit with capacity up to 750 tph; mechanical vibrating conveyors and electrical vibrating feeders; magnetic separators for removal of tramp iron.

Kanawha Mfg. Co., Charleston, W. Va. —Design and erection of coal preparation plants.

Link-Belt Co., Chicago 1—Link-Belt Multi-Louvre drier; Link-Belt heavy-media float-sink concentrator; "CA" concentric-action vibrator with heated screen cloth.

Ludlow-Saylor Wire Cloth Co., St. Louis 10—Wire cloth, wire filter cloth and square- and long-opening woven-wire screens, including abrasion-resistant square-opening screens woven of 1-in Super-Loy bars; also fine-mesh wire cloth with hook-stripped edges for easy application to tensioned screens and coarser meshes with hooked edges for supporting and protecting fine-mesh screens; various types of hook strips.

McLanahan & Stone Corp., Hollidaysburg, Pa.—Coal crushers, including the Bantam Buster crusher made in sizes up to and including 30x60-in, capable of handling lumps up to 24 in and making a product with a top-size range from ¾- to 8-in; capacities up to 1,000 tph; NEW hydraulically controlled single-roll coal crusher featuring hydraulic adjustment for rapid product size variation and automatic protection against tramp iron. This unit is in the experimental and development stage.

McNally Pittsburg Mfg. Corp., Pittsburg, Kans.—Main and divisional offices established for discussion of all problems on coal cleaning, screening, centrifuging and general preparation; NEW Dryclone 40-tph centrifugal fine-coal drier featuring central feed, minimum number of parts and accessibility for easy replacement. Unit is direct mounted on motor and fits in a space only 6 ft in diameter and 4 ft-1 in above floor level.

Morris Machine Works, Baldwinsville, N. Y.—2-in Type R slurry pump featuring ease of dismantling and accessibility; also Morris abrasives-handling pumps.

Nelson L. Davis Co., Chicago 4 — Neldco 2-stage dense-media coal-cleaning plant producing intermediate product for further treatment; also standard coal-cleaning plants, 20 to 350 tph, and custom-built plants.

Oliver United Filters, Inc., N. Y.— Oliver horizontal and American disk filters; also Olivite acid-handling and ODS slurry pumps.

Pennsylvania Crusher Co., Philadelphia 7 — Bradford breakers, Bradford hammermill Granulators, single-roll crushers, and one-way and reversible hammermills, featuring the peripheral-feed Bradford hammermill for large-coal preparation; also jaw and Gyracone crushers, Impactors, Dixie Non-Clog hammermills.

Pioneer Engineering Works, Inc., Minneapolis, Minn. — Pioneer vibrating screens and feeders.

Productive Equipment Corp., Chicago 12—Gyroset vibrating screen, equipped with electrically heated screen cloth; L & L cleaner readily installed on any standard unit to eliminate blinding caused by near-size plugging.

Roberts & Schaefer Co., Chicago 6— Coal-processing plants and equipment; NEW Convertol process available for dewatering and cleaning fine-mesh slurries. Features of the new process introduced in the United States by R&S are low initial cost and high efficiency.

Robt. Holmes & Bros., Inc., Danville, Ill.—Holmes lowering spirals; Holmes Baughman Verti-Vane thermal drier for 1½-in and smaller coal; Holmes railroad-car handling equipment; Holmes laboratory crushers and pulverizers.

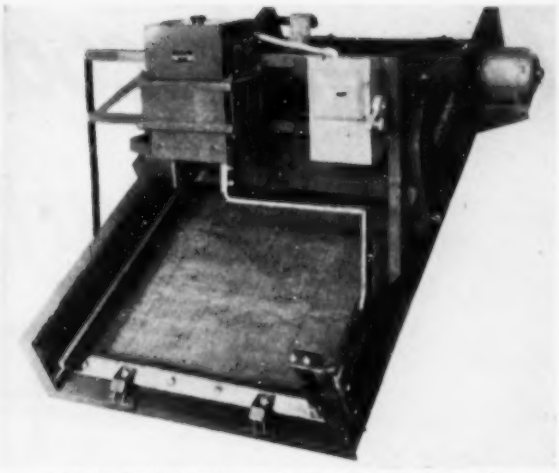
Shell Oil Co., New York 20—Limea and Carnea coal-spray oils.

Simplicity Engineering Co., Durand, Mich.—Single-deck 4x8-ft Gyrator Model GB coal screen with heated cloth; Model OA-10-N single-deck Simplicity D'Watering screen with Bixby-Zimmer screen jacket.

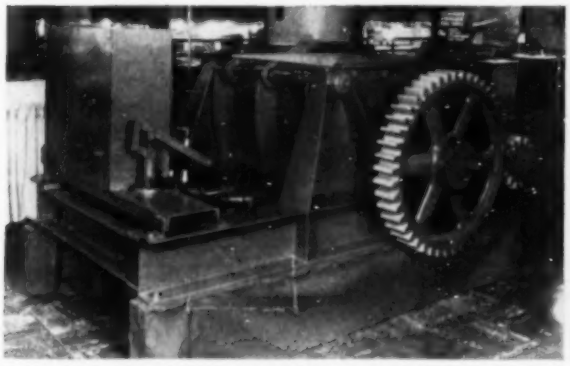
Solvay Process Div., Allied Chemical & Dye Corp., New York 6—Calcium chloride for freezeproofing and dustproofing coal.

Stearns Magnetic, Inc., Milwaukee 46

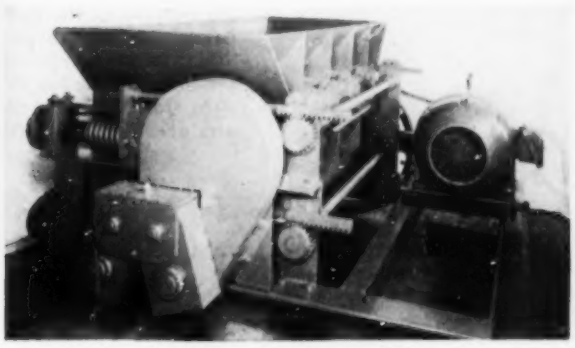
McNally-Pittsburg Dryclone fine-coal centrifugal drier.



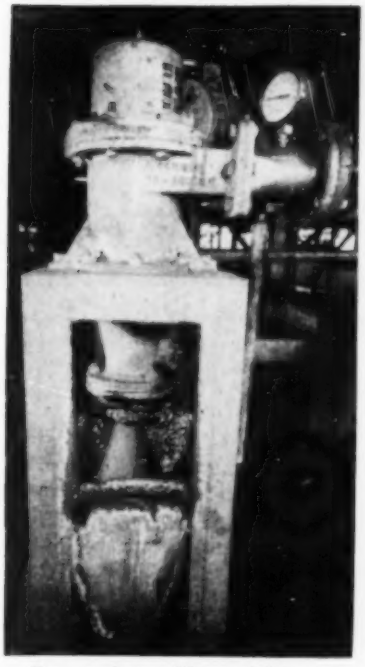
Deister Leahy screen with FlexFlex heating unit.



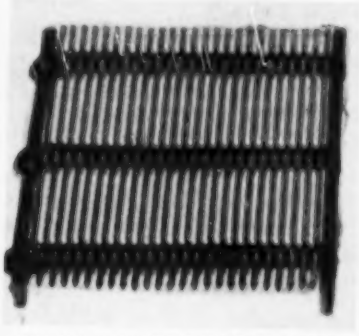
McLanahan & Stone hydraulically controlled crusher.



Gundlach two-stage crusher.



Dorr cyclone with special wear-resistant liner.

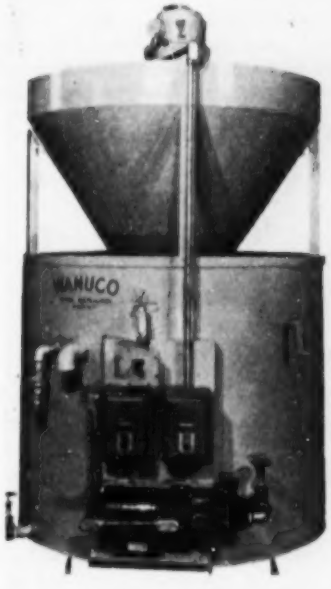


Hendrick Wedge-Slot 15A screen.

—36x36-in rectangular suspension magnet; 24x24-in permanent magnetic pulley.

Syntron Co., Homer City, Pa.—Syntron vibrating grizzlies, screens and picking tables; bin vibrators; test-sieve shakers.

T. J. Gundlach Machine Co., Belleville, Ind.—NEW two-stage crusher capable of crushing lumps up to 30 in, making a product with a top-size range from ⅝ in up to 6 in; sizes 18, 27, 36, 56 in; capacities, 60-80, 90-125, 150-200, 250-300 tph; also 9-, 18-, 27-, 36-in single-stage crushers, 25-30, 60-80, 90-125, 150-200 tps.



Water Neutralizing Wanuco water-treating unit.

The only coal mine with NO COST PROBLEMS

To survive in the coal mining business today, there can be no let-up in the never ending search for ways and means to lower costs. With coal sales and coal production in a temporary decline, low cost mines are in a better position to bid for the going business, and high cost mines must eventually shut down. Management just can't afford to operate high-cost mines for any great length of time in periods of low demand.

Coal Age

— January Symposium — "Cost Cutting Today" — First of a Penetrating Series on Cost Cutting — Attracts Industry-Wide Attention

ARKANSAS

"After looking over your special report on 'Cost Cutting Today,' we have discovered we are losing twenty minutes a day on transporting our men in and out of the mine. I am sure we will catch other lost time motions that will also count up.

"Please send us 30 copies of 'Cost Cutting Today' for I feel as though it will help us a lot."
Vice President and General Manager

PENNSYLVANIA (Anthracite)

"Send 465 copies of report, 'Cost Cutting Today'."
Manager of Mines

"Send 100 reprints of 'Cost Cutting Today'."
Assistant General Manager

"Send 30 copies of 'Cost Cutting Today'."
Vice President and General Manager

PENNSYLVANIA (Bituminous)

"I have the article, 'Cost Cutting Today,' in the January issue of COAL AGE, and am very much impressed with the information it contains.

"We would like to have 160 reprints of this article for our mines in Pennsylvania and West Virginia."
General Manager

"We think this is a very interesting and worth-while report and are going to distribute it to our supervisory personnel. Please send us 25 copies of 'Cost Cutting Today'."
Vice President

"This is a splendid article, and since our entire supervisory force is subscribing to COAL AGE, we have asked each one of them to read the article carefully."
President

"Kindly send us 25 copies of 'Cost Cutting Today'."
Vice President

TENNESSEE

"'Cost Cutting Today' is great. Please send us 15 reprints of this article. Accept my congratulations on this article."
President

UTAH

"Please send us 10 copies of 'Cost Cutting Today' for our use with our employees."
President

WEST VIRGINIA

"You are to be congratulated on your continued interest in those subjects which are so important in creating a healthy industry. As a matter of review in our own organization, I am ordering 30 reprints of 'Cost Cutting Today' for distribution among our key men."
General Manager

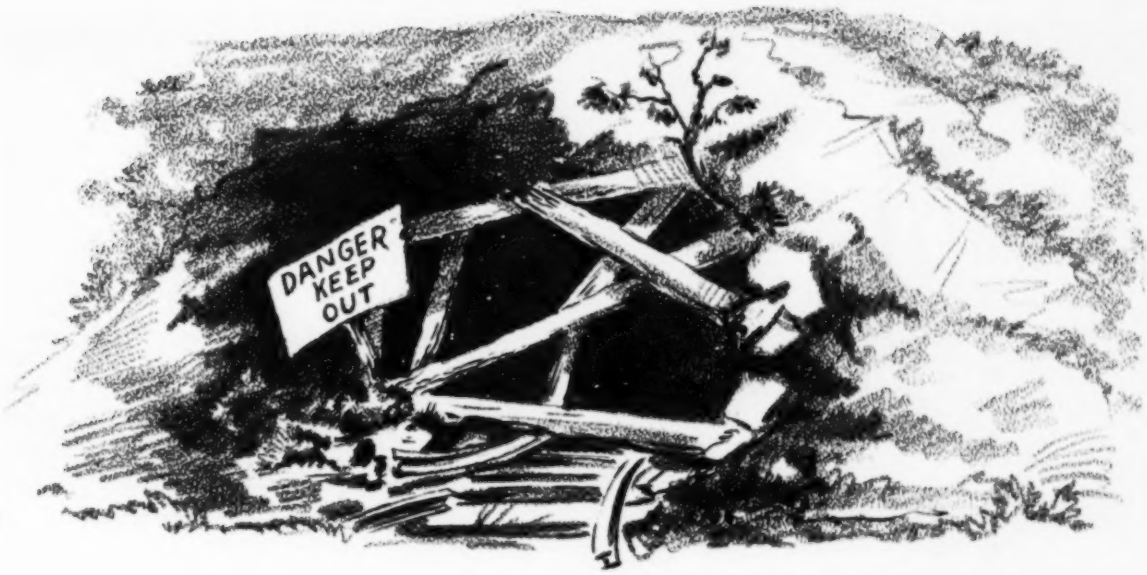
"Please send 150 copies of special report, 'Cost Cutting Today'."
Vice President in Charge of Operations

"Please enter our order for 100 reprints of 'Cost Cutting Today'."
Assistant to the President

"Send 23 copies of 'Cost Cutting Today'."
General Manager

WYOMING

"Will you kindly send us 12 copies of 'Cost Cutting Today'."
President



FIRST of the Cost Cutting Series

January COAL AGE, page 70-83: "Cost Cutting Today. What's Needed . . . How To Do It." A ten-point, basic cost cutting program.

1. **Spend money to save money**
2. **Develop manpower efficiency**
3. **Analyze and act**
4. **Check cost constantly**
5. **Watch supply cost**
6. **Make maintenance work**
7. **Check new methods**
8. **Compare results**
9. **Check at grassroots**
10. **Keep on the beam**

Many companies are using reprints of this article as a basis for educational and training programs—to cut costs. If you would like to have extra copies of this special report to step-up your own program of cost reduction—reprints are available at 25¢ each in quantities of 20 or less; at 20¢ each for 21 or more.

SECOND of the Cost Cutting Series

May COAL AGE, page 86-91: "Efficiency — Machine Made"

In the past ten years the industry has invested approximately $2,000,000,000 in new mines and new equipment, including preparation plants and such auxiliaries as ventilating and power equipment and so on. At least half, or more than $1 billion, has gone for mechanical-mining and stripping equipment proper, including such auxiliaries as cutting, drilling and transportation equipment. The bituminous investment, with improvements in methods, has resulted in a saving of around $1 per ton in this ten-year period. . . . How machines can be made to do more for coal. . . . What the future holds in machine production.

Don't Miss . . . The Third of the Cost Cutting Series

"How To Cut Cost"
. . . With Modern Equipment
. . . And Modern Methods

Coal Age

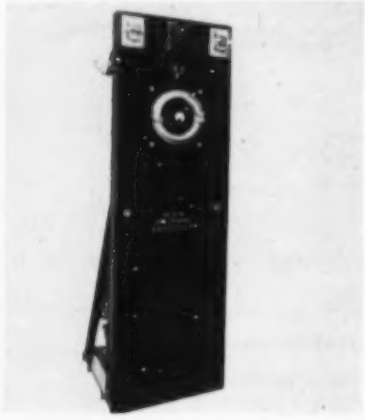
IN JULY

A McGRAW-HILL PUBLICATION
330 West 42nd Street, New York 36, N. Y.

Farmers Engineering Pagephone.

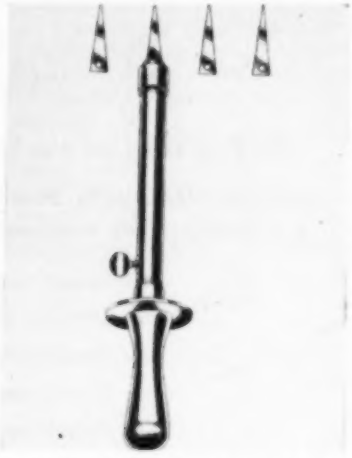
Bullard fiberglas cap (Safety First Supply Co.).

MSA pulmonary ventilator.



MSA methane recorder.

MSA Holstphone.



American Mine Supply spads and spad-installation gun.

W. S. Tyler Co., Cleveland 14—NEW Ty-Rock vibrating screen; Ro-Tap testing-sieve shakers; Tyler standard-screen testing sets; Hummer electrically-heated screens; woven-wire screen cloth.

United Engineers & Constructors, Inc., Philadelphia—Preparation services.

United States Steel Corp. subsidiaries, Pittsburgh 30—Stainless-steel for preparation-plant applications.

Water Neutralizing Co., Columbia, Mo., or Box 867, Terre Haute, Ind.—NEW Wanuco water-neutralizing unit for treatment of make-up water in preparation plants to insure longer service life from pumps, pipe lines, screens, conveyors, etc., and for treatment of water discharged to clean streams (*Coal Age*, October, 1952).

Wedge Bar Screen Corp., Far Rockaway, N. Y.—Wedge Bar screens, including curved and circular sections with reinforced and framed construction.

Wedge Wire Corp., Cleveland 2—Wedge Wire Kleenslot screens in various styles and constructions, including stainless-steel and others; featuring NEW curved screens constructed with curved wire and designed to keep slivers from passing through wire.

Western Machinery Co., San Francisco 7—Wemco 4x4-ft drum separator for heavy-media coal separation; 44-in Wemco Fagregren flotation machine; and NEW revolutionary-type Wemco solids pump that provides characteristics and features of centrifugal pumps with added advantage of a new-design rotor capable of handling full size of material that will pass through pipe lines. To be available in 1½- to 12-in sizes, the unit is a "vaneless" pump, utilizing recesses in the rotor to set up a vortex for moving liquid and material.

Wilmot Engineering Co., Hazleton, Pa.—Wilmot Hydrotator, Hydrotator-classifier froth-flotation systems, jigs and Hydro-separators; Wilmot-Daniels heavy-media system; Keystone rivetless-chain conveyors in drop-forged-steel, alloy- or cast-chrome-manganese construction.

Safety and Communication

American Mine Door Co., Canton 6, Ohio—Little Chief rock duster.

Baker-Raulang Co., Cleveland 2, and **J. H. Fletcher Co.**, Huntington, W. Va.—Baker mine trikes for personnel-carrying underground.

Boston Woven Hose & Rubber Co., Cambridge, Mass.—Treated fire hose; neoprene rock-dust hose.

Farmers Engineering & Mfg. Co., Irwin, Pa. — Femco trolleyphone equipment for mine communication; audiphone for voice amplification, particularly at preparation plants; Cagephone for communication to and from surface cage and shaft levels; and NEW Pagephone for intercommunication between wired stations which combines loudspeaker paging of all stations from any one station with private handset conversations thereafter.

General Electric Co., Schenectady, N. Y.—Complete line of mine-communication equipment; G-E mine-service lamps for haulageway lighting and machine headlamps.

Johns-Manville Sales Corp., New York 16—Corrugated and flat Transite for fire barriers.

Martindale Electric Co., Cleveland 7—Martindale protective dust masks with replaceable filter elements, and Martindale protective eyeshields.

Mine Safety Appliances Co., Pittsburgh 8—Edison R-4 cap lamps; MSA Bantam rock duster; and a complete line of safety equipment, including a new-design self rescuer; NEW pulmonary ventilator; NEW MSA bolt-hole cleaner available for use with all types of mine drills, with cyclone and filter to remove dust; NEW MSA methane recorder providing continuous, exact and permanent record of

Improved AMERICAN Container-Cartridge makes Loading Quicker, Easier!

Constant Cyanamid research in the field has resulted in an improved shipping-loading container-cartridge that's already a favorite for coal stripping operations.

These convenient 25-lb. cartridges are strapped in bundles of two for easy handling. Clearly printed end labels show in an instant the grade you want. Each cartridge is readily loaded into the hole, and, when you're ready to shoot, there are no cases or boxes to litter the blasting area.

Cyanamid quality control gives you sure firing and good breakage from every American blasting agent. They're available from plants and magazines in key areas throughout the country. Make your next order American.

Capable field engineers are available at your call

High Explosives • Permissibles • Blasting Powder
Blasting Accessories

AMERICAN *Cyanamid* COMPANY

EXPLOSIVES DEPARTMENT

30 Rockefeller Plaza, New York 20, N. Y.

Sales Offices: Pittsburgh, Pa., Bluefield, W. Va., Scranton, Pa., Chicago, Ill., Pottsville, Pa., Maynard, Mass.

methane concentrations from 0.04 to 2.0% in return air; NEW MSA Hoist-Phone permitting communication between hoisting engineer and cage at all times.

National Mine Service Co., Beckley, W. Va.—Wheat electric cap lamps with automatic charging and electronically controlled voltage regulation, featuring new 50- and 100-lamp automatic-charging racks on which miners can rack own lamps and no attendant is required, particularly adaptable to separate or isolated portals; Koehler flame safety lamps in steel and aluminum, including NEW National model available in steel construction for heavy-duty service.

Protectoseal Co., Chicago 8—Fire-prevention equipment for the safe handling, storing and dispensing of flammable liquids, featuring non-explosive safety cans, oil-waste cans, containers for parts-washing liquids, safe transfer pumps, flame-arrester vents for storage tanks, pipeline arresters, safe filler caps and other safety containers, fittings and devices.

Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.—Safety trolley-wire guards, including NEW improved Buronik vinyl-plastic flameproof guard, colored yellow for visibility and "grooved" and pliable for easy drop over wire but with sufficient rigidity for full protection.

Safety First Supply Co., Pittsburgh 19—Scott Air-Pak self-contained breathing apparatus; various types of safety equipment; NEW fiberglass safety cap featuring lighter weight, more air space, greater resistance to impact and speedy removal of liner.

United States Rubber Co., New York 20—Trolley-guard rubber, Uskon floor mats.

Mining Specialties And Services

American Mine Supply Co., Pittsburgh 19—NEW American spad gun, a hand-operated, rapid-acting easily handled mechanism that drives spads into coal or timber in one motion, eliminating need of hammering; American-design spads for anchoring brattice, water pipes, air hose, telephone lines, etc.; and NEW American spad hangers suitable for both sidewall and roof suspension in either open or lock types.

Bituminous Coal Institute, Inc., Washington 5—Public-relations and merchandising services of the National Coal Association.

Intrusion-Prepakt, Inc., The Prepakt Concrete Co., Cleveland 14—Special-application grouting and concrete services for water control in underground operations and in applications where coarse aggregate may be prepacked and then filled and solidified by grouting, thus keeping coarse aggregate out of the mixing operations.

Johns-Manville Sales Corp., New York 16—Corrugated and flat Transite for tipples and other structures.

Manu-Mine Research & Development Corp., Reading, Pa.—Soil-solidification and underground water control through special grouting methods; borehole exploration of strata through specially designed instruments; sealing compounds for controlling seepage.

Olin Industries, Inc., Explosives Div., East Alton, Ill.—Ramset fastening system using powder-actuated process for setting studs in wood, concrete and other materials, including Ramset actuating tools, blank cartridges and complete line of Tru-Set studs.

L. R. Smith & Sons, Inc., Charleston, W. Va.—Wild HeerBrugg Model T-1 transit, featuring optical plumbing, optical presentation of both horizontal and vertical angles through one eyepiece, and reading accuracy of 1 min direct and 6 sec by interpolation. Optical micrometer prevents gross reading errors; also, other optical instruments for engineering applications.

Tamping Bag Co., Mt. Vernon, Ill.—Brush and weed-control chemicals for right-of-way spraying and general weed control.

Toledo Porcelain Enamel Products Co., Toledo, Ohio—V-Corr roofing, siding and flashing made with a vitrified coating of silicates and metallic oxides fused to both sides of a corrugated sheet-steel base and offering complete protection against fire, fumes, moisture, smoke, etc., and long service without rusting or corrosion.

AMC Convention Report Cont'd . . . Begins on p 96

Handling New Management Problems

"Handling labor disputes under the anthracite grievance adjustment machinery goes down to the grass roots."

Marking the 50th year of the Anthracite Board of Conciliation, Thomas E. Larkin, umpire for the board, traced the history of grievance-adjustment machinery in the anthracite field and explained the reasons for its continued effectiveness.

Dr. Larkin divided the history of the board into three eras: (1) 1903-1911, when grievances were adjusted under a weak labor organization; (2) 1912-1928, when grievance committees helped handle disputes at the mine and when the UMWA won complete recognition; and (3) 1929-1953, when grievances were handled under business unionism with a closed shop, the check-off and skilled union district leaders. The secrets of the board's success lie in the existence of definite procedures for handling grievances, specific understandings on jurisdiction between the board and the umpire, and the establishment of rules governing established rates and practices, Dr. Larkin explained.

From 1903 to 1951, inclusive, the board has processed 6,553 grievances. Of this total, 2,973 were settled without adjudication—that is, were withdrawn or adjusted; 3,580 were disposed of by adjudication; the board ruled on 352; and the umpire decided 3,228. Statistical data indicate that approximately 10 grievances are settled on company property for every one sent to the board. Also, data show that workers raise some 96% of all grievances, about three-fifths of which are over rates and payments. Stability of the board should be credited to the long tenure of board members and umpires (only four umpires in 50 yr), the informality of public hearings conducted by the board, the integrity of witnesses, and the skill and honesty of umpires, Dr. Larkin said.

Discussion following Dr. Larkin's address brought out that the experience of the anthracite industry in conciliating labor disputes might be helpful to the bituminous industry. It was brought out also that the umpire does not sit on the board—in fact, does not even live in the anthracite region and has no social contacts with the people of the region.

"No one pattern of business organization will fit the needs of all coal companies."

Though general business principles prevail in the coal industry, special considerations within the industry govern the organization of individual companies, said Paul Weir, president, Paul Weir Co. These special considerations are the varying needs of commercial and "captive" companies; the frequent incidence of family ownership, making for decentralized organization; and the fact that the wide experience and training of chief executive officers is more important than any centralized or decentralized organization pattern.

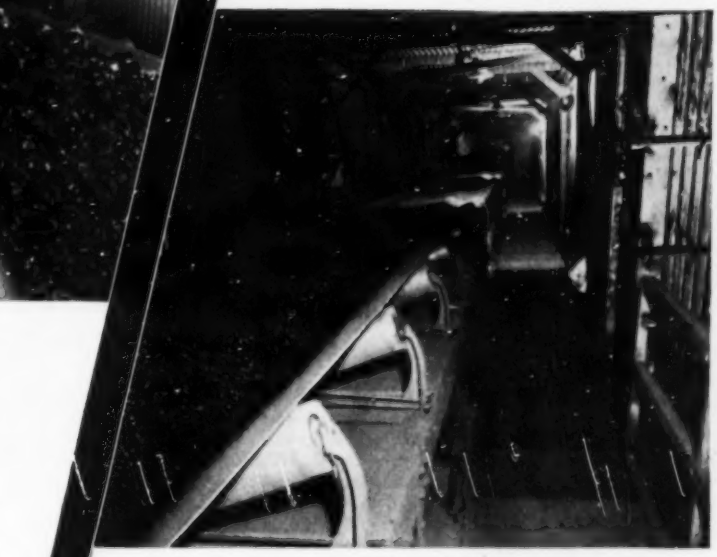
Stating his personal beliefs as to the best coal-company organization, Mr. Weir listed the following: (1) a minimum of centralization with a small staff of good engineers has much merit in coal; (2) authority and responsibility should be placed in line management rather than in staff personnel; (3) few coal companies are big enough to afford a centralized organization; (4) personnel is more important than any pattern of organization; (5) the size of a company is a factor in the decision for or against centralization; (6) textbook formulas for organization have little application in coal; and (7) the versatility of mining men solves many of the problems of organization in the coal industry.

"If the coal industry fails to be helpful in controlling stream pollution, government will take over."

Coal preparation—with the help of U. S. Rubber

Section of U.S. Giant® Conveyor Belt delivering raw coal to cleaning plant.

About two million tons of coal go through this plant in a year.



Ridding coal of impurities is an exacting job—especially when the coal preparation plant is geared to handle 750 tons per hour or about two million tons per year of 7 accurate sizes. When a West Virginia plant was faced with this production quota, United States Rubber Company conveyor belts, 11 in all, were specified—to insure top output with minimum cost and trouble.

Your own belt problem may be run-of-the-mill or absolutely unique. Whatever it is, hand it over to "U.S." engineers. They are stationed in 25 strategically located district sales offices. Write to address below.

This plant uses another "U.S." product—Pilot® Flexible Pipe that carries a mixture of magnetite and water in the preparation plant, guards equipment from the effects of vibration, expansion and contraction.

U.S.RUBBER
SERVING THROUGH SCIENCE

"U.S." Research perfects it.
"U.S." Production builds it.
U.S. Industry depends on it.

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

For other industries, stream-pollution problems are different, but for coal the major concerns are acid mine water discharged into streams and suspended solids contained in water discharged from preparation plants, said Henry F. Hebley, research consultant, Pittsburgh Consolidation Coal Co. Mr. Hebley was lead-off speaker in a seven-man panel that discussed stream sanitation problems in the Ohio River valley. Panel chairman was E. R. Price, manager, coal properties, Inland Steel Co. Other panel members were J. J. Foster, vice president, Island Creek Coal Co.; W. E. Bearce, Hanna Coal Co.; W. L. McMorris, coal preparation manager, Coal Div., U. S. Steel Corp.; L. E. Sawyer, director of reclamation, Indiana Coal Producers' Association; and Thomas C. Cheasley, assistant to the president, Sinclair Coal Co.

Summarized, comments of panel members were as follows:

Dr. Hebley—Great pressures are exerted on public regulatory bodies to restrict industries that contribute to stream pollution. Coal is one of the targets. Yet pressure groups and regulatory commissions often overlook the fact that acid mine water, unlike industrial wastes from other industries, is made by nature, not by man. They also overlook the fact that acid mine water flows from worked-out and abandoned mines, not active mines. Thus the problem is extremely difficult and no cure-all has yet been discovered that is practicable and economically sound. As for discharge of suspended solids from preparation plants, the problem is not insoluble and coal companies are making progress. But the suspended-solids problem of each coal company is unique and regulatory bodies should consider each case on its own merits.

Mr. Price—The Ohio River Valley Sanitary Water Commission was set up in 1948, when eight states signed a compact looking to control of stream pollution. The courts have upheld the commission's powers and authority. Thus far, the commission has acted cooperatively and rationally, not arbitrarily or capriciously. Committees to consult and work with the commission have been named by steel, coal, oil, chemical and other industries.

Mr. Bearce—On the problem of suspended solids, there are not yet any widely accepted standards for preparation-plant performance. One stumbling-block to the evolution of standards is the lack of uniformity in plant efficiency and in the character of the water used for washing coal. Economics must play a strong role in steps taken to reduce discharge of suspended solids, because installing equipment would put out of business many companies that now are marginal.

Mr. McMorris—At the Robena mine, apparatus now is being installed to remove suspended solids from plant discharge. The system puts together known devices and techniques based on research and on experience in other plants, notably the Price plant of Inland Steel Co., Wheelwright, Ky. The system involves: (1) flocculation with lime or starch; (2) thickening flocculated solids and treating them in a centrifuge; and (3) mixing the cake from the centrifugal filter with coarse refuse. Much of the slime will be isolated in advance of fine-coal washing, thus taking some of the load off the centrifugal filters. A full report on the process will be ready about a year hence.

Mr. Sawyer—In Indiana, the problem of suspended solids is not acute, since topography generally favors construction of settling ponds. Nor is the problem of acid mine water severe, since pit lakes impound the water and seal the outcrops. Gob roads are giving some trouble by forming acid water, but gob now is being covered over and few companies are using it for building roads.

Mr. Cheasley—Land-use committees set up by coal-industry associations are marking up many achievements which, if properly publicized along with statements of aims and principles, may do much to ward off ill-advised or hysterical legislation. Politicians are feeling pressures from many quarters and, overlooking stream pollution by raw sewage and silt, will act to the harm of the industry unless coal men pursue their research and put its fruits to work.

Mr. Foster—By counseling and helping legislators and member of regulatory commissions, coal men can direct legislation along a sound course. In West Virginia, for example, the water commission framed a drastic bill and asked the legislature to act on it. The proposed bill set no limits on the authority of the commission. But a committee of coal men presented the industry's case to the commission and offered suggestions for constructive legislation. The meeting was friendly and helpful and resulted in a revised bill that gives the coal industry the right of a hearing and a court review.

In open discussion following the formal presentation by the panel, Dr. Hebley stressed the need for a handbook that would dispel many unfounded notions about stream pollution and would help coal men avoid stream pollution. William Foster, U. S. Steel Corp., pointed out that the Ohio River Valley Sanitary Water Commission does have authority to enforce the law and to move in on situations where state law or state enforcement is inadequate, provided that commission representatives of the state concerned vote to move in. E. J. Cleary, executive director of the commission, described in detail the organization and procedure of the commission and explained that its aim is minimum dislocation for industry compatible with accomplishment of basic aims.

Raising Mining Efficiency

"Without minimizing the importance of new equipment, the industry must utilize what it has, tried and proved, with full effectiveness."

Tonnage per face man of 35.8 and a recovery average of 88% in United No. 1 mine of Truax-Traer Coal Co., Kayford, W. Va., are the end results of experience recounted by Mack H. Shumate, assistant general manager of the mine.

Obtaining maximum extraction in first mining with mobile loaders, shuttle cars and belt haulage to the outside, United No. 1 mine produces 1,500 tpd; loading machines and cutting machines work, respectively, 51.5 and 55% of the working day; and mechanical breakdowns total only 8.8% of working time, Mr. Shumate reported. The mine was opened in 1949 in the No. 2 Gas seam, which has an average dip of 2% and ranges from 54 to 72 in in thickness where clean. In some places, the seam is separated by a 1- to 24-in middleman. Little mining is done where the middleman exceeds 12 in.

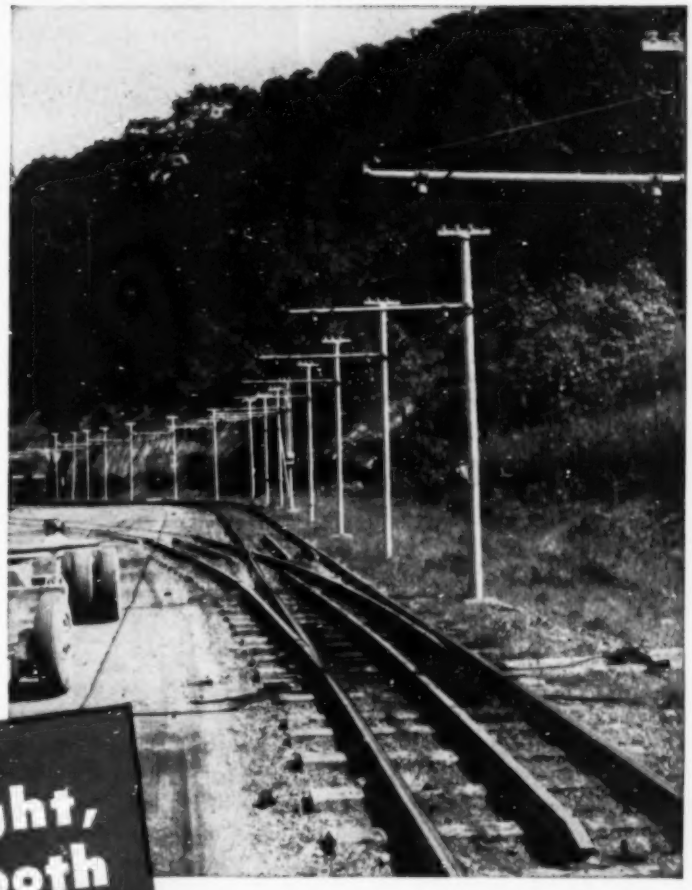
The equipment consists of Joy loaders, Joy undercutting and shearing machines, Jeffrey drills carried on the cutting units, Joy 5SC cable-reel shuttle cars, a Joy compressor mounted on rubber tires, Le Roi-Cleveland short stopers, C-P impact wrenches and Brownie dust collectors. Main entries consist of eight headings 18 ft wide on 60-ft centers. Panel or butt entries turned right and left consist of five headings 18 ft wide on 50-ft centers with crosscuts on 80-ft centers. Unusually, panel entries are driven to the outcrop or boundary before any rooms are worked. Rooms 200 ft deep by 20 ft wide are driven off one side in sets of five on 30- to 40-ft centers. A panel is 400 ft wide and 1,500 to 2,500 ft long. The five rooms start and finish together and the room pillars are mined back immediately. The next step is to recover the equivalent entry blocks.

Shuttle-car travel is limited to 375 ft, Mr. Shumate pointed out. Cars discharge into hoppers built over the belts and equipped with a grid of 12-in-square openings through which the boom man works any oversize material. This system reduces belt wear and spillage and loads the belt uniformly. Ensign Electric belt hesitators automatically control panel belts for uniform loading of the main belt. To the hesitator-operating mechanism is linked a contactor operating a solenoid sprinkler valve for allaying dust at the transfer point.

Trends toward opening smaller properties, providing better maintenance and improving supervision were stressed by William J. Shields, assistant chief mining engineer, Rochester & Pittsburgh Coal Co., in a paper titled "Mechanical Mining in Thin Seams." The operation he described is in the Upper Freeport seam, where 42 to 44 in of working height is available and where 25 to 35% of the working places are in bad roof areas. Several smaller belt-haulage mines, ranging from 800 to 1,500 tpd, have been developed from strip highwalls. The largest of these is 8,800 ft deep and 10,060 ft across.

Under normal roof, belt entries are

This kind of OVERHEAD Lets Trips Move FAST!



....it's straight, level and smooth

Fittings for use on pipe for overhead supports like this are shown in the O-B No. 27 Catalog. Check it for materials used on wood, steel, or roof, also.

Current collectors skim smoothly along a trolley wire like the one shown above! They hug a wire that's level and straight, and motormen know they can move fast when collectors act that way. You can have this kind of overhead-easily-throughout your haulage system; inside and out. With O-B Trolley and Feeder Materials, you can build it on any kind of support structure - on pipe, on timbering or on I-beams, or fasten it right to the roof. O-B hangers, adapters, and expansion bolts for use on all these supports let you hang O-B Smooth Underrun Trolley Materials wherever track is laid.

"Straight, level and smooth" describes the overhead you want for fast haulage. Build it anywhere with O-B Smooth Underrun Trolley Materials.

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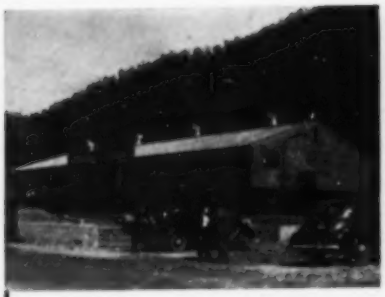

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Substation

14 ft wide, airways 18 ft wide and rooms 35x325 ft. Room headings are driven to 5,200 ft, or two belt lengths, thus eliminating some deadwork. A unit works a series of adjacent rooms, providing a place for each part of the working cycle and a cut in one room to be shot down ahead of the loader. A crew of eight men loads five to seven cuts, producing an average of 175 tons of raw coal per shift, or 21.9 tons per face man. The highest daily average tonnage for one week was 1,235 tons, or 15 tons per payroll man, including a proportionate share of cleaning-plant labor and supervision.

Mr. Shields emphasized the need for good supervision, stating that it is a product of good management and is required for translating all engineering and planning. "Without it," he said, "the best of equipment and the best of engineering will lose much of their effectiveness." Among the tools used at R. & P. for improving supervision, Mr. Shields listed the following: (1) technical extension classes, (2) special instruction in supervisory techniques, such as, JIT and JMT, (3) supervisory conference meetings, (4) individual coaching by other officials, (5) visits to observe other successful supervisors, and (6) periodic audits of supervisory skills.

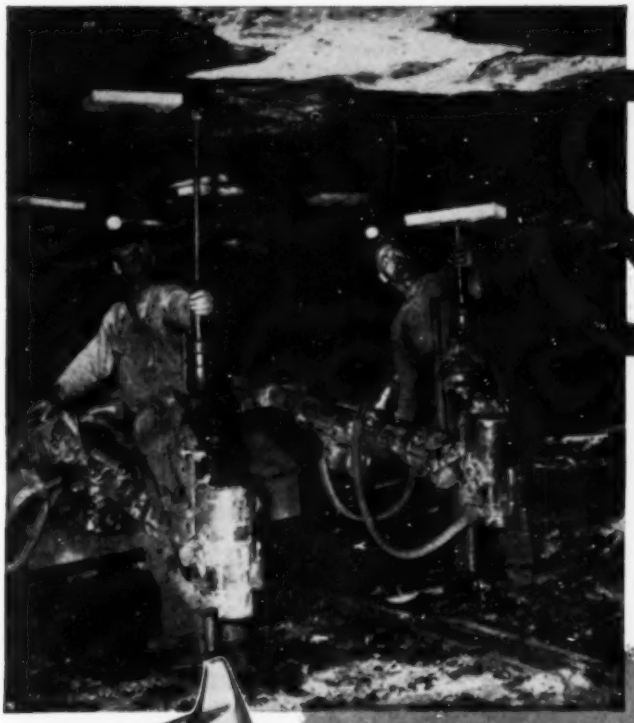
"Proper face preparation is the key to high production."

Listing the basic specifications for efficient face preparation, Emmett T. Lang, industrial engineer, Powhatan Mining Co., warned that the ultimate goal in efficiency cannot be reached without the understanding and cooperation of workers. Mr. Lang described mining methods, roof support, cutting, drilling and blasting techniques in three Powhatan mines, all within 6 mi of each other and all in the Pittsburgh No. 8 seam. Seam thickness averages 62 in. There is a ½-in sulphur band near the bottom, a ¼-in band near the center, 20 to 24 in of drawslate at the top, and 12 in of roof coal above. Conventional mobile-loader sections remove the entire seam and drawslate.

At one mine, where there is no small-coal cleaning equipment, the slate is loaded separately, Mr. Lang explained. This mine, recently purchased, cuts with Goodman shortwalls and breaks with Airdox. One section, however, is cut and sheared with a Sullivan 10RU machine. In the other mines, all cutting is done with the 10RU machines and blasting is done with permissible powder.

Because of tender roof, the entries are held down to 12 ft in width and the rooms are kept in the 15- to 20-ft range. Conventional timbering is used everywhere except one section of one mine, where the stone above the roof coal is a soft drawslate or soapstone. There, 5-ft steel bolts are used to suspend the conglomerate from a streak of limestone.

Post-mounted electric drills, either Jeffrey A6 or Chicago Pneumatic, drill for shooting, Mr. Lang said. In room work, three coal holes and three stone holes are drilled. The difficulty of drilling



Track-mounted drill with two booms makes hole-drilling and bolt-tightening swifter than ever. Bolting crews work without delay when O-B shells and plugs are used.

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YOU BUY.... Speed WHEN YOU BUY O-B SHELLS AND PLUGS

● That's right! Speedy roof bolt installation goes hand in hand with the use of O-B Expansion Shells and Plugs. They're the shells and plugs that are lubricated. Plug threads are always clean and rust-free, ready for assembly on the roof bolt. Shells and plugs are never rusted together.

O-B shells and plugs are pre-expanded to fit bolt holes without any adjustment, with plenty of spring to hug the wall of any right-size hole. Bolts with O-B shells and plugs tighten every time!

Bolting fits right into the face working cycle when a two-man crew can set six four-foot bolts in 20 minutes! That's the kind of bolting you can do with O-B Expansion Shells and Plugs. Give them a try. You'll buy bolting speed when you buy O-B shells and plugs.

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the stone holes forbids hand-held drills. After a trial at multiple shooting, the mine has been returned to single shooting to protect the loading crews from unfired shots, which formerly occurred too often. A recent study with single shooting showed an average of 6.8 tons of raw material blasted per pound of explosive. The present system has reduced powder consumption, increased loadability and produced more of the larger coal sizes.

Mines now considered highly modern still are pushing for further advances in methods and equipment. That thought lay between the lines of a paper presented by W. I. Husk, chief engineer, West Kentucky Coal Co., at the close of the face-preparation session. Among his "wants," he listed the following:

1. A rotary drill economical for both the soft strata and the hard limestone over No. 11 coal, since "stopers fail miserably to drill wet shale."
2. A method of mining to permit some pillar recovery on retreat to lessen the danger of squeezes.
3. A mining system to reduce the number of moves, perhaps using long rooms paralleling the entries.
4. An economical cutting bit for use at all times on the bottom in the No. 9 coal.
5. For tension in 2,500-ft belts, a horizontal method instead of a vertically-moving take-up weight.
6. A more satisfactory instrument for handling belts prior to moving from one location to another.
7. For supply track along belt lines, sectional fabrication to facilitate moving.
8. A light and economical diesel locomotive for use on man and supply tracks.
9. A pallet system for hauling supplies into the mine and handling them underground.
10. A continuous mining machine to penetrate under very bad top with the operator remaining under good top, getting 36 tons per face man and maintaining acceptable size consist.

In describing methods used by his company in mines in the No. 9 and No. 11 seams, Mr. Husk told of using an English-built roof-bolting stoper with a hole running completely through it so that a vacuum pump can pull the cuttings through ⅜-in hole in the drill steel. Dust is collected in three stages in two cones and a bag. The count shows that dust is kept within permissible limits. The cutting bit is round and has four carbide inserts and four dust-intake holes between inserts.

Although stoper bits cost $20, including tariff, the cost per ton for bits has been only 8 mills, against 11 mills for throwaway bits on other types of stoper. The cost of roof-bolting is 35.3c per ton, against 24.9c for conventional timbering, but the tonnage increase with roof-bolting more than offsets the difference, Mr. Husk said. Roof-bolting has largely met the difficulty of holding bad top in the No. 11 seam.

Answering a question by Mr. Hayden, Mr. Husk said that wooden pins, 1⅛ in by 3 ft are being used successfully in rooms in Stony Point mine in western Kentucky. The West Kentucky Coal Co., however, is not using wooden pins, earlier experiments with pins of larger size having made drilling costs too high.

Roof Support and Pillar Extraction

"The experimental program was so successful that roof-bolting of all working places on cycle was begun several months later."

Roof-bolting, said E. R. Cooper, general manager of coal mines, Jones & Laughlin Steel Corp., Pittsburgh, Pa., made it possible to continue a section in Vesta No. 4 mine that was driving toward a reserve area and encountered roof conditions so bad that, with conventional timbering, the coal was economically unmineable and "near the point of not being mineable at all." He also stated that without roof bolts other large portions of the Vesta mines could not be worked.

Roof bolts are 99.9% effective in J. & L. mines. Since 1949, over a million tons has been produced under roof bolts and failures have occurred on only about 350 ft of entry. In the advancing entry section that encountered particularly bad top, trouble from methane largely disappeared after bolting became routine. Before that, heavy gas feeders stopped work several times. Apparently, the roof-bolting holes free the methane outby the face in such a way that the air provided by the normal brattice sweeps the gas away before it can accumulate at the face.

Roof-bolting changed the picture from considering "abandoning the mine as unworkable" to a successful operation, said J. C. Hunter, general manager, The Powellton Coal Co., in recounting bolting experience at the new Jane Anne No. 4 mine, in Logan County, W. Va., and at three other company mines. Since the start of bolting in 1949, the four mines have produced over 4½ million tons of coal, of which 90% has come from faces with bolting. Total bolts installed is about 925,000, and over 160 mi of entry is thus protected. There has been no serious accident to personnel or equipment as a result of roof-bolt failure.

Standard equipment for roof bolting, using expansion shells, consists of a 217-cfm Schramm compressor on a Joy T-2 truck with two 60-gal water tanks, one Cleveland S11S stoper drill 21 in high with a lift of 17 in, one Ingersoll Rand 514 or Chicago Pneumatic 365 impact wrench, two complete sets of drill steel, sufficient Throwaway bits for one shift, one bit knocker, and one 6-lb hammer. Compared to standard rock bits, the Throwaway bit does not chip or break at the corners of the cutting edges, does not lose its gage as quickly, and costs much less.

Air pressure reduced to 35 psi forces water from the household-type tanks to the drill. The 550 ft of trailing cable powering the compressor has a 4/0 Miller connector every 100 ft for disconnecting at any point where it is necessary to cross over or under other cables in the mine.

Conventional timbering costs for the first 6 mo of 1950 against bolting costs for the full year 1952 were compared for two Bell & Zoller Coal & Mining Co. mines by Herman E. Knight, division engineer, Madisonville, Ky. At Mine "A," timbering cost 28.4c per ton (19.9c labor and 8.5c supplies), compared to 26.1c per ton for bolting (17.3c labor and 10.8c supplies). At Mine "B," the cost of conventional timbering was 27.5c per ton (16.7c labor and 10.8c supplies); cost of bolting, 39c per ton (18.4c labor and 20.6c supplies).

"All the mines of the Bell & Zoller Coal & Mining Co.," said Mr. Knight, "have experienced a substantial improvement in efficiency and safety since the introduction of roof-bolting." At the two mines in western Kentucky and the three in Illinois, a total of 399,062 ft of roof was bolted in 1952—156,982 ft entries, 151,234 ft rooms, and 90,846 ft crosscuts.

In describing roof conditions, bolting methods and bolting equipment, Mr. Knight noted that the roof at Zeigler No. 3 mine, in Illinois, was a treacherous soft shale or siltstone. The top at Oriole mine, in western Kentucky, is a shale or gob of little inherent strength immediately overlying the coal, with a stratum of dense gray limestone above. In both the soft drilling at Zeigler No. 3 and the hard limestone at Oriole, rotary drills with tungsten-carbide bits are employed, and the machines are equipped with Chicago Pneumatic electric drills. Expansion-type bolts are used at both mines. The drills are mounted on Baker-Raulang tractors with the batteries removed.

"Conservation of coal reserves, reduced capital outlay for opening new properties, efficient mining, and reduced fire hazard have resulted from the recovery of pillars."

Recovery of over 85% of the coal under heavy cover has been achieved in the pitching-seam mines of the Union Pacific Coal Co., Rock Springs, Wyo., observed Robert F. Bowie, planning and research engineer. Pillars have been recovered under cover ranging from 30 to 1,800 ft. When a pair of entries on 60-ft centers are driven by mobile loaders or shaker conveyors to the boundary, shaker conveyors start retreating in rooms and pillars.

Rooms 24 ft wide on 55-ft centers are driven up the pitch to the worked-out entry above. Mining of a pillar is done by successive pockets driven at an angle, starting with a pocket 26 ft from the room face. The second pocket at an angle of 75 to 80 deg with the room and

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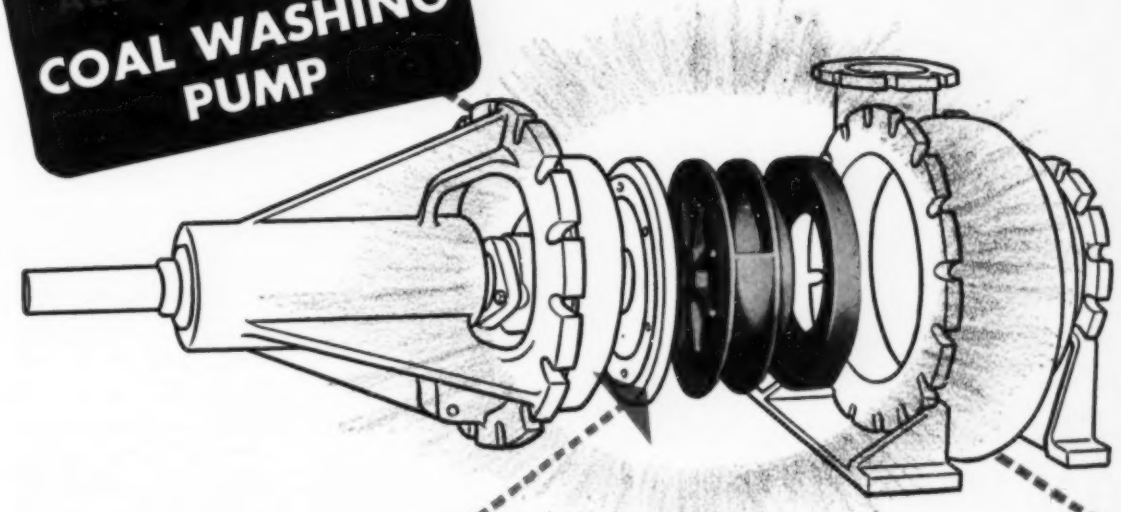
COAL WASHING PUMP



50% Increase in Impeller and Wear Plate Hardness Gives Longer Pump Life

COAL WASHING PLANT OPERATORS can now expect longer service than ever before from Allis-Chalmers Coal Washing Pumps. Impellers and suction wear plates, parts of the pump receiving greatest wear, have been increased from approximately 400 to 600 Brinell through the use of *Ni-Hard* for these parts as standard equipment at no extra cost. Replacement impellers and suction wear plates for Allis-Chalmers Coal Washing Pumps now in service can be furnished in *Ni-Hard*.

EASY TO SERVICE

All parts of the Allis-Chalmers Coal Washing Pump are easy to remove and replace. The rotating element can be removed and replaced in a half hour. Parts subjected to varying rates of wear are separated into easy-to-handle sections. Standardization of bearing support bracket parts makes many parts interchangeable between different pump sizes and reduces parts inventory when you operate more than one pump.

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Allis-Chalmers application engineers are thoroughly familiar with all types of coal washing equipment problems. Allis-Chalmers can furnish you a complete pumping unit — pump, motor, control and drive — all of coordinated design and manufacture. For help on your coal washing problems, call your nearest Allis-Chalmers District Office. For more information on the A-C coal washing pump with *Ni-Hard* impeller and wear plate, write Allis-Chalmers, Milwaukee 1, Wis. for Bulletin 08B6381.

A-3896

Simple construction. Only five wearing parts: shaft sleeve, impeller, casting, two wear plates. All easy to handle and easy to replace.

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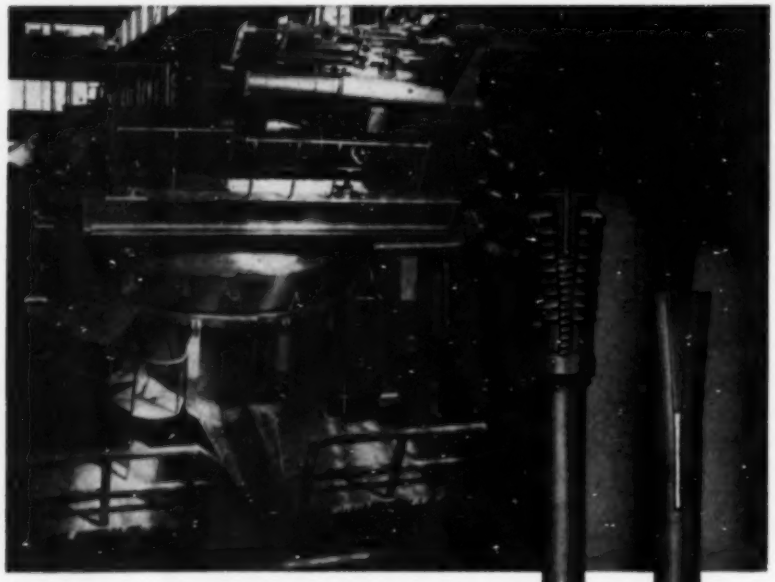

WEST VIRGINIA'S NEW ELECTRIC FURNACE

West Virginia Steel's giant new, multi-million-dollar electric furnace is evidence of the steps being taken continually by West Virginia to bring the mining industry better quality steel products—trackwork, ties, turnouts, rail, West Virginia roof bolts—for lower maintenance costs, higher economy and greater safety. For *now*, when you specify *West Virginia*, you get steel products *quality controlled* through every step of the way, from raw material to finished product.

WEST VIRGINIA ROOF BOLTS

As an example, West Virginia roof bolts and expansion units, long accepted for safety, economy, dependability and easy, low-cost installation, are now being used in an ever-increasing number of mines for better roof support and freer passageways for haulage and ventilation. Timbering is eliminated. Available in both wedge and expansion sleeve types, complete with all accessories—not "assembly jobs", but manufactured from start to finish from first quality specification steel in West Virginia Steel's modern plant.

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WRITE FOR NEW ROOF BOLTING BULLETIN

Manufacturers of RAILS and ACCESSORIES TRACK WORK STEEL TIES

West Virginia Steel & Mfg. Co.

Huntington, West Virginia

driven 18 ft wide is turned approximately 39 ft below the first. Widening above is done until the caved pocket above is encountered, leaving a thin shell on the inside of the pocket and an 8-ft safety stump on the outside. The safety stump then is mined as completely as possible and the remnant is drilled and shot.

Timbering in rooms and pillars consists of posts and crossbars as required. The entrance to a pillar pocket is protected by a bridge bar placed under the ends of the crossbars along the pillar to be pocketed. As the pocket is mined, a partial breaker row of timber is set even with the low rib of the pocket and 90 deg with the room line. When the pocket is mined and the unit is moved back, the breaker row is completed and a partial row is started for the next pillar. Using a mechanical puller, required by the Wyoming mine law, the timber is pulled as soon as possible after moving back. Caving usually starts within a few hours and is stopped by the breaker row.

There is a trend toward mobile equipment, Mr. Bowie noted, but Union Pacific is not using it under cover exceeding 700 ft. Four tractor-tread shuttle cars have been installed recently for work on these steep pitches and are very successful.

Eighty-percent recovery in a 25-ft anthracite vein pitching 12 deg was detailed by R. M. von Storch, superintendent, The Hudson Coal Co., who also discussed early anthracite mining and emphasized the unsystematic methods followed in early extraction. Irregular pillars furnished poor support and eventually caused squeezes that carried over large areas. Because the coal reserves then seemed almost inexhaustible, there was no intention of recovering pillars.

The production of many collieries now is almost entirely from pillar areas first mined many years ago and now being reopened. The 25-ft bed is the Red Ash at Loree colliery. Overlying strata total 525 ft and from them four beds of coal have been removed. The immediate roof over the 25-ft bed is 8 to 10 ft of weak sand-shale, followed by 37 ft of strong sandstone.

Large pillars are mined by driving splits in the bottom coal 6 to 7 ft high up the center of the pillar. On retreat, 8-ft places at right angles are driven to the edge of the pillar, using a bellcrank to turn the shaker conveyor. After reaching the cave, top coal is shot down, except for some barred down by using a long pipe. Complete records kept on the area show that coal removed in first mining is 45%, after which 65% of the pillars is recovered.

YOUR ORGANIZATION is of interest to others in the industry as well, so why not make it a point to inform *Coal Age* of newsworthy events, personnel changes, unusual production or safety activities, etc.? Just write: The Editor, *Coal Age*, 330 W. 42d St., New York 36, N. Y.

Here's your Field-Proved, Mobile Cutter for very Low Vein Coal

. . . the JOY 12-RB Cutter

and here's the rest of the JOY LOW VEIN TEAM

Meet the JOY 12-RB, above . . . the cutter member of the *only* mechanized mining team designed specifically for high-capacity production in very low vein coal. With the Joy 20-BU-1 Loader and 8-SC Shuttle Car, it assures field-proved flexibility and economy never before available to mines operating in extremely thin seams.

The 12-RB is a highly mobile and maneuverable rubber-tired cutting machine only 26" high, supplied either as a top or bottom cutter, and readily convertible. Its high tramming speed and variable hydraulic feed (which provides a cutting rate up to 70 ft. per minute) together permit cutting more places per shift. Bar tilt, roll and lift are hydraulically controlled, and steering is also hydraulic, with a separate motor serving the hydraulic pump.

20-BU-1 LOADER ↑ and the 8-SC SHUTTLE CAR →

Only 24" high, yet can load up to 8 tons per minute. Fast tramming, easily maneuverable, features independently driven conveyor and gathering head. While a shuttle car is away, the gathering arms can provide a fully-loaded conveyor ready for quick loading when the car returns. Also permits continued loading even if the gathering arms are momentarily stalled with hard digging.

Features 4-wheel positive drive, 4-wheel hydraulic steering, tapered-end design for minimum turning clearance, height of only 26" and level capacity of 2 tons. Separate motors for traction, conveyor drive, and hydraulic pump drive. Disc-type brakes on all wheels, hydraulic cable reel and hydraulically-adjustable elevating discharge.

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Joy Sulmet Bits, tipped with sintered tungsten carbide inserts, are made in a variety of types and different degrees of hardness to meet any mining condition. They fit any cutter, and by actual case records, out-perform every other bit on the market.

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A MESSAGE TO AMERICAN INDUSTRY • ONE OF A SERIES

DEPRECIATION

And Its Crucial Economic Role

The sixth annual McGraw-Hill survey of Business' Plans for New Plants and Equipment, just completed, reveals some remarkable facts about the role of depreciation in our economy. To most people, depreciation is a technical term, used by accountants to discuss a dull subject. But it really is a simple matter: It is the amount of money set aside each year by a company to replace plant and equipment that is wearing out. And here are some facts from this survey* which show how depreciation can make the difference between prosperity and recession in the United States:

1. *In 1953, about half of all the money spent on new manufacturing plants and equipment will come from depreciation reserves.* For the future, manufacturing companies are relying even more heavily on this source of money. In the years 1954-56, they count on using their depreciation funds to pay for almost two-thirds of the new plants and equipment now planned.

2. *The amounts of money made available by depreciation allowances vary greatly from industry to industry.* Some industries, such as those producing steel, chemicals and petroleum products, will have relatively large amounts of cash available from their depreciation reserves. In considerable measure, this is because the government is allowing them to accumulate such reserves at an accelerated rate as an encouragement to build facilities required for national defense. But most of the companies engaged in the production of textiles, processed foods and many kinds of machinery have had little chance to benefit by this provision for accelerated depreciation. Hence, they have much less money available from depreciation reserves.

3. *There is a definite shortage of investment funds in the industries that have relatively low depreciation allowances.* Taken together, the coal mining, textile, food processing, machinery and other metal-fabricating industries plan to spend about $4.7 billion for new plant and equipment this year. But they report that they would spend $1.5 billion *more* per year during the period 1954-56 if sufficient funds were available.

4. *Eighty-five per cent of the manufacturing companies covered by the survey reported that they plan to invest all their depreciation funds* to keep equipment up-to-date and to provide capacity for new products and new markets. These companies could let their depreciation funds pile up as idle cash. But the intention is to spend most of them for capital equipment.

*The sixth annual McGraw-Hill survey of Business' Plans for New Plants and Equipment included companies that provide 25 per cent of all industrial employment and 60 per cent of employment in those industries where capital investment is highest. These companies are mostly the larger companies in their respective industries. A copy of the full report of this survey can be obtained by addressing: Department of Economics, McGraw-Hill Publishing Company, Inc., 330 West 42nd St., New York 36, N. Y.

Hence, there is a direct relationship between the amount of depreciation funds available and the level of capital investment. And it is upon the latter that the level of general prosperity decisively depends. One-third of all industrial workers are engaged in producing or installing such equipment.

This fact that the level of depreciation allowances has a major bearing on the level of capital investment should not surprise anyone. In several foreign countries where these allowances have been increased, investment has boomed. The two nations with the highest ratios of investment to national income are Canada and Norway. Both countries adopted flexible depreciation policies after World War II. In Sweden and The Netherlands also, flexible depreciation allowances have contributed to rapid industrial expansion. Finally, the tremendous investment brought about by our own rapid amortization program shows dramatically the importance of depreciation in stimulating capital expenditures.

Obsolete Tax Laws

In spite of this record, the fact remains that our laws and the business procedures that govern depreciation allowances — in particular the laws and rulings that govern the deduction of depreciation from taxable corporate income — are still based on antique and obsolete accounting concepts which take no account of depreciation's dynamic role in our economy. The internal revenue code still requires most companies to depreciate their equipment over a long period, even though these small annual allowances cannot possibly pay for the investment that is necessary to keep a plant up-to-date under today's rapidly changing technology, with its production of new and improved machinery.

The only allowance made by the government for rapid depreciation is that which is authorized for certain types of plants during the defense emergency. Under this policy most companies are unable to use accelerated depreciation for tax purposes. And as defense projects are completed, the number of new authorizations is dropping. We may lose the chance to utilize fully this powerful tool for sustaining investment because, under our ramshackle emergency tax structure, accelerated depreciation is available only to a minority of firms on a temporary basis.

New Policy Needed

A sensible, up-to-date depreciation policy for tax purposes is long overdue. Either the Treasury must modernize the internal revenue code on its own initiative, or Congress must take the lead by writing into permanent law a flexible depreciation policy applicable to all companies.

Treasury experts now have before them a number of proposals to allow faster depreciation for the average firm. The U.S. Chamber of Commerce has suggested that companies be allowed to deduct from taxable income 25 per cent of the cost of new equipment in the first year, with the remaining cost to be deductible over the life of the facilities. The Machinery and Allied Products Institute has long sponsored a formula that would allow full deduction in two-thirds of the estimated life of the property. In Congress, Chairman Reed of the Joint Committee on Internal Revenue Taxation has stated that we need a more flexible depreciation policy. Senator Frear of Delaware has introduced a bill that would let a business make its own choice on how fast to depreciate its equipment.

It will take time and study to determine which of these various proposals best fits the needs of the economy without sacrificing unduly the revenue needs of the government. If we are to have a new depreciation policy, designed for a long period ahead, it must be carefully worked out. But this much is clear right now: *The development of a flexible depreciation policy on the part of the federal tax authorities is one of the most important steps that can be taken to sustain prosperity. When we talk about depreciation, we are talking about the money that pays for almost two-thirds of the new manufacturing facilities now scheduled for construction. We are talking about the new investment and the new jobs on which our continued prosperity depends.*

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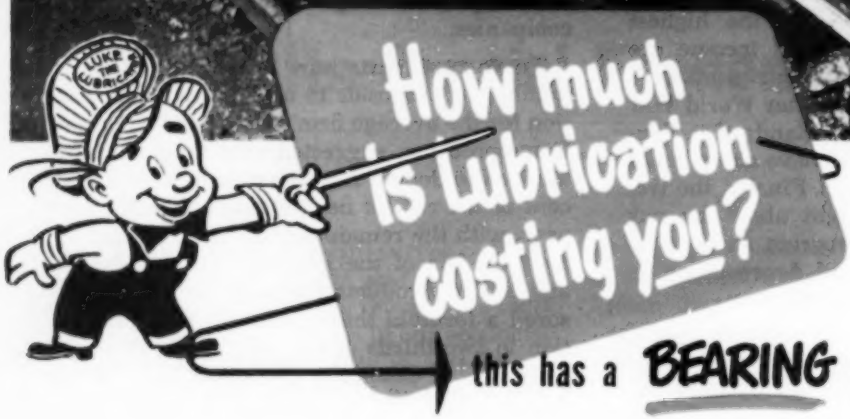

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News Round-Up

AGE Plans Revolutionary Generating Unit

A MAJOR FORWARD STEP in the technology of economical generation of steam-electric power was announced May 21. It is a new boiler and turbo-generating unit designed to cross the barrier of the "critical pressure" of steam for the first time in the commercial production of electric power. It will be the most efficient generating unit ever built and will utilize the unprecedented steam pressure and temperature of 4,500 psi and 1,150 deg F, respectively.

Announcement of plans to build the unit was made by Philip Sporn, president, American Gas & Electric Co.; Alfred Iddees, president, Babcock & Wilcox Co., and Glen B. Warren, vice president, General Electric Co., and general manager of its Turbine Div.

After many months of study and preliminary design, the three companies have just reached agreements under which General Electric will design and manufacture a 120,000-kw turbine, and Babcock & Wilcox will design and build the boiler for it. The turbine, at 4,500 psi, will operate at almost double the present highest steam pressure utilized for power generation. The initial steam temperature of 1,150 deg will be 50 deg above the present highest and will be followed by two stages of reheat, the first at 1,050 deg and the second at 1,000 deg. The boiler will be the "once-through" universal-pressure type, in which water at 5,500 psi is pumped through and changed into super-heated steam in a single fast passage through the tubes in the boiler. It will be equipped with the revolutionary cyclone furnaces to insure the rapid and complete burning of the coal and prevent air pollution.

The entire project, cost of which will exceed $12 million, is being engineered by American Gas & Electric Service Corp., a subsidiary of American Gas & Electric Co. The new unit will be installed under its supervision at The Ohio Power Co.'s Philo plant near Zanesville, Ohio. Ohio Power is an AGE operating company subsidiary.

"The use of higher pressures, higher temperatures and new ideas in reheat at Philo," Mr. Sporn declared, "will make possible not only new world standards of efficiency in generation of steam-electric power, but ultimately will make possible capital reductions by compressing size of units and bringing about more effective utilization of materials.

"Even more important," he continued, "is the fact that the successful development of power generation at this new plateau of higher pressures and temperatures will make possible in time still higher pressures and temperatures and additional reheats and resulting efficiencies hardly visualized a few years ago. Efficiencies of conversion of the heat in fuel into electric energy of the order of 50 per cent are distinct possibilities. Certainly they loom on the horizon." The AGE president stated that, like all advances in the power field made by any one group during the entire history of the electric power industry, this new advance will become available to the entire industry.

United Electric Moves Coal By Water to Great Lakes Customers

Industry history was made May 7 when a new system of coal transportation promising substantial freight-cost savings to Great Lakes industries was inaugurated in a joint operation by the United Electric Coal Cos. and Truax-Traer Coal Co.

A cargo of approximately 6,000 tons of Fulton County washed screenings was transported by barge up the Illinois River from Liverpool, Ill., and transferred to the self-loader steamship, Robert J. Paisley at S. Chicago. The coal was consigned to the Ludington, Mich., plant of the Dow Chemical Co. "To the best of our knowledge," said John M. Morris, United Electric vice president, "this is the first time the all-water route has been used to serve industrial and utility plants in the Great Lakes area."

"In this operation," Mr. Morris continued, "we unloaded coal from the barges to the dock; then transferred it to the steamer. We are developing and plan to construct facilities which will enable us to load directly from barges to the lake vessel. In addition to savings in freight costs, this new system opens a potentially large, new market for Illinois coal."

United Electric was a pioneer in the development of water-borne transportation of coal. Marquette Cement Mfg. Co., at its Oglesby, Ill., plant, was the first large consumer to take its entire requirements via the Illinois waterways system. Later a considerable tonnage was moved up the Mississippi River by United Electric to large consumers in the Minneapolis-St. Paul area. Truax-Traer Coal Co. followed quickly in the development of their river-loading dock and today the movement of water-borne coal on the two rivers totals approximately 8,500,000 tons annually.

Lewis Blocks Action On New Bureau Head

The appointment of a new director of the USBM to replace John J. Forbes is being held up because of the active opposition of John L. Lewis, UMWA president. According to reports, Secretary of the Interior Douglas McKay sent to the White House late in March the name of Tom Lyon, a mining engineer and geologist of Salt Lake City, as successor to Mr. Forbes, even though Mr. Lewis had previously protested the appointment. Mr. Lewis and other UMWA officials reportedly then objected directly to the White House, which was understood to be delaying sending Mr. Lyon's appointment to the Senate for confirmation. Mr. Lyon, well known in Western mining areas, formerly was with the Anaconda Copper Mining Co. Following a conference with Mr. McKay, Mr. Lewis told the press May 18 that the appointment was a "diabolical outrage" and a "political crime against the coal mining population." Mr. Lewis called Mr. Lyon a "comparative ignoramus" not qualified to look after the safety of coal miners and said, "The Secretary of the Interior will have the blood of the coal miners on his hands." When James Boyd, Mr. Forbes' predecessor, was appointed by Pres. Truman in 1947, Mr. Lewis prevented Senate confirmation for 2 yr by his opposition on the grounds that Mr. Boyd was unfamiliar with coal mining.

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House Oil-Import Hearings End; Observers See Close Vote

The House Ways & Means Committee ended hearings May 19 on the Simpson bill (H.R. 4294), which would extend and modify the Reciprocal Trade Agreements Act by clamping quota limitations on imports of foreign oil. The committee was expected soon to go into executive session to decide what kind of bill to report out.

"All indications are that the vote will be close on the question of restricting foreign residual oil," said Tom Pickett, executive vice president, National Coal Association, as the hearings ended. Explaining that there still was time to impress upon the committee the need for keeping the oil-limitation clauses of the bill intact, Mr. Pickett urged coal men and others interested to write, wire or telephone their congressmen and express their views.

Meanwhile, the Senate Finance Committee approved a bill providing for a study of the Nation's foreign-trade policy. This bill, introduced by Senator Eugene Millikin (R., Colo.), is in line with President Eisenhower's request that the Reciprocal Trade Agreements Act be extended without change pending a year-long study by a special commission. The Millikin measure would set up a commission of three senators, three representatives and five Presidential appointees.

The parade of witnesses appearing before the House Ways & Means Committee included representatives of coal and railroad management and labor, independent (domestic) oil producers and congressmen from coal-producing states. Advocates for oil-importing interests also spoke their pieces before the committee.

Among others speaking in behalf of coal were the following: Representatives H. O. Staggers (W. Va.), A. B. Kelley (Pa.), J. P. Saylor (Pa.), J. E. Van Zandt (Pa.), Elizabeth Kee (W. Va.), William Wampler (Va.), R. C. Byrd (W. Va.), C. M. Bailey (W. Va.) and E. J. Bonin (Pa.); Mr. Pickett; Dr. F. K. Edwards, NCA; G. A. Lamb, Pittsburgh Consolidation Coal Co.; R. D. Campbell, Island Creek Coal Co.; F. W. Earnest Jr., The Anthracite Institute; W. D. Johnson, Order of Railway Conductors of America; Thomas Kennedy, UMWA; R. L. Ireland, Pittsburgh Consolidation Coal Co.; Dr. C. J. Potter, Rochester & Pittsburgh Coal Co.; J. M. Symes, Pennsylvania R. R.; S. T. Saunders, Norfolk & Western Ry. Co.; and H. L. Walker, Chesapeake & Ohio R. R. Co.

News Briefs and Trends

Two More States Join Bureau In Enforcing Safety Act

The states of North Dakota and Oklahoma have made cooperative agreements with the USBM for joint federal-state inspection of mines under the Federal Coal Mine Safety Act of 1952, the Bureau has announced. Similar cooperative plans have been previously arranged with the states of Washington and Wyoming. All four plans remain in effect indefinitely unless cancelled by either the state or the Bureau.

Producers and Retailers Study Residential Markets

Coal producers, retailers and researchers met May 6, in Columbus, Ohio, to evaluate the status of coal-fired automatic residential heating equipment and to consider ways to increase coal markets through the sale of such equipment. Eighty of the country's leading coal producers and retailers from 12 states attended the meeting sponsored jointly by Bituminous Coal Research, Inc., the American Retail Coal Association and the Product Promotion Committee of the National Coal Association. It was the first joint undertaking of these groups. In addition to examining equipment available, producers and retailers during the afternoon session discussed how the stoker-coal market could be regained by more intensive effort through the sale of stokers. The session was led by Raymond Salvati, president, Island Creek Coal Co., and Robert Bidlack, president, American Retail Coal Association. Julian E. Tobey, president of Appalachian Coals, Inc., summarizing the joint meeting, urged a continuation of research and invention on residential-size stokers and additional conferences of this type.

Bituminous Output Turns Up

Bituminous production during the week ending May 16, 1953, totalled 9,125,000 tons, compared with 8,317,000 tons in the corresponding week of 1952, according to USBM figures. In four of the five weeks since mid-April 1953 output has showed gains over 1952. For the year through May 16, production was 166,575,000 tons, 13.7% below the same period of 1952, but a considerable improvement over the first several months of 1953. Stocks on April 1 were estimated at 70,235,000 tons, a drop of about 13,000,000 tons since Oct. 1, and the lower stocks were expected to be a factor in the continuing strengthening of coal demand. In anthracite, output through the week of May 16 was 10,601,000 tons, 32.5% below 1952.

TVA Lets Coal Contracts

The Tennessee Valley Authority announced May 14 the award of contracts ranging from 1 to 3 yr for the purchase of 3,365,000 tons of coal to be used at its Johnsonville, Shawnee and Colbert power plants. The contracts went to 11 companies and most of the coal will be shipped from West Kentucky fields by rail to Grand Rivers, Ky., and from there by barge to the plants. TVA also reported that it had rejected as too high all bids for coal for its Widows Creek plant and that it would ask for new bids.

Coal Firms Merge Operations

The Sheridan-Wyoming Coal Co., Inc., and Big Horn Coal Co., Sheridan, Wyo., announced May 8 that their total output in the future would be produced from Big Horn strippings and sold by Sheridan-Wyoming under the trade name of "Kleenburn." Sheridan-Wyoming's Monarch mine, an underground operation which produced 270,685 tons in 1952, was scheduled to be closed immediately. In West Virginia, stockholders of the West Gulf Coal Co. and the Gulf Mining Co. have approved merger of the two companies as the Gulf Mining Co. P. C. Graney, president of the former Gulf Mining, is president and general manager of the new company and its combined production will be about 3,000 tpd. In Illinois, a plan for the reorganization of the Franklin County Coal Corp., including a new $250,000 stock issue, that would provide for re-opening of its properties was approved by a federal district court May 15. Holders of first mortgage bonds have agreed to purchase the stock and creditors will be paid in full, it was reported, but no date has been set as yet for resumption of mining.

And Briefly . . .

The Pocahontas Operators' Association last month began a 5-wk advertising campaign in 29 newspapers in 13 cities of Illinois, Indiana, Michigan and Ohio to tell household coal users the "advantages of filling their bins during the summer season." The 25 member mines of the **Kentucky River Mining Institute,** Hazard, Ky., mined 5,177,356 tons in 1952, for a fatality rate of 1,035,471, the second time in the last several years the million-ton mark has been exceeded. In 1949, when the institute received a Holmes Certificate of Honor, the rate was 1,040,552 tons per fatality. The Eisenhower Cabinet May 8 voted unanimous approval of the **St. Lawrence Seaway and Power Project,** adding its approval to prior endorsements by the President and the National Security Council. **A new Illinois coal mining code** called "the best mining law in any state in the country" and reportedly backed by both labor and "90% of the coal mining industry" was introduced in the legislature May 4 under the sponsorship of Gov. William G. Stratton. **The combined bituminous and anthracite fatality rate** for the first 4 mo of 1953 was 0.99, compared with 1.20 for the same period in 1952. The April bituminous rate of 0.65 was the best so far this year.

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Personal Notes

Blue Diamond Advances Top Officials

GORDON BONNYMAN (left) has been elected president of the Blue Diamond Coal Co., Knoxville, Tenn., succeeding his father, the late Alexander Bonnyman. John Mayhew (right) was named general manager of mines, succeeding him. An engineering graduate of Princeton University, Mr. Bonnyman joined the company's engineering department in 1945 and after holding various posts became general manager of mines last year. Mr. Mayhew has been associated with Blue Diamond for some 25 yr and formerly was manager of northern mines for the company.

Safety Engineer Retires

JOHN LYONS, safety engineer, Bell & Zoller Coal Co., Zeigler, Ill. since 1928, has retired after 53 yr of service to the coal mining industry. Born in England, he came to the U. S. in 1912, and joined the company in 1926 as an examiner. Mr. Lyons was honored by friends and associates at a dinner in Herrin, Ill., May 1. C. Ward Padgett, general superintendent, presented him with a gold watch and luggage in behalf of those present.

William G. Leake has been appointed superintendent, Warden mine, Pittsburgh Coal Co., Div. of Pittsburgh Consolidation Coal Co., Library, Pa., succeeding **William Murphy,** who has retired as a result of ill health.

Frank G. Smith, formerly senior vice president, has been elected president, Sunday Creek Coal Co., Columbus, Ohio, succeeding **Chester H. Cook,** retired. Mr. Smith has been associated with the company since 1933. Other officers elected include **Gen. Carlton S. Dargusch,** chairman of the board; **Seymour G. Hughes,** senior vice president and secretary; **M. I. Penn,** treasurer; **Walter T. Fassig,** vice president of sales; and **E. H. Petrie,** vice president of engineering.

Woodward Iron Co., Woodward, Ala., has made several changes in its supervisory personnel. **Paul Ford,** superintendent, Dolomite mine, has been made superintendent of Mulga mine, succeeding **T. H. Kirk,** named chief mining superintendent. **John Hager,** formerly chief mining engineer, has been named general superintendent of mines, succeeding **Hewitt Smith,** vice president. **M. T. Gilchrist** has been appointed superintendent of Dolomite mine.

B. H. Schull, director, Illinois state Department of Mines and Minerals, has named **Ray McCluskey** state mine inspector at large, succeeding **Murrell S. Reak** who recently became assistant director of the department.

New W. Va. Mines Chief

JOSEPH BIERER has been appointed chief, West Virginia Department of Mines. Assistant to the chief since 1947 and most recently serving as acting chief, Mr. Bierer joined the department in 1933 as a district inspector, advancing to inspector-at-large and special inspector. Recently, he has devoted his time to the department's rock-dusting program. After his graduation from West Virginia University as a civil engineer, he worked for a number of years with the West Virginia State Road Commission, prior to joining the Department of Mines.

W. L. Burruss Jr., assistant chief engineer since 1952, has been named chief engineer, The New River Co., succeeding **J. E. Howard,** who retired after 23 yr with the company. Prior to joining New River 9 yr ago, Mr. Burruss was superintendent of the Milburn mine, Milburn By-Products Coal Co., and spent 14 yr with Eastern Gas & Fuel Associates.

Officers and directors of Feds Creek Coal Co., Inc., and H. E. Harman Coal Corp., Harman, Va., and their sales agency, Norfolk & Chesapeake Coal Corp., were elected at the annual stockholders meeting April 23. Feds Creek officials are: **I. J. Richardson,** president; **Mrs. Mary Harman White,** vice president; and **E. N. Harris,** secretary-treasurer. Officers of the H. E. Harman Coal Corp. are: **Mr. Richardson,** president; **Mrs Cary Harman Biggs,** vice president; and **Mr. Harris,** secretary-treasurer. **James W. Harman,** former vice president of both mining companies, was elected chairman of the board of all three.

Peabody Coal Co., Chicago, has made several executive personnel changes. **Charles S. Ellis,** previously senior vice president, was named chairman, executive committee. **Joseph Solari,** vice president, succeeds Mr. Ellis. **O. Gressens,** financial vice president and treasurer, was named executive vice president. **Joseph G. Solari,** formerly assistant to the

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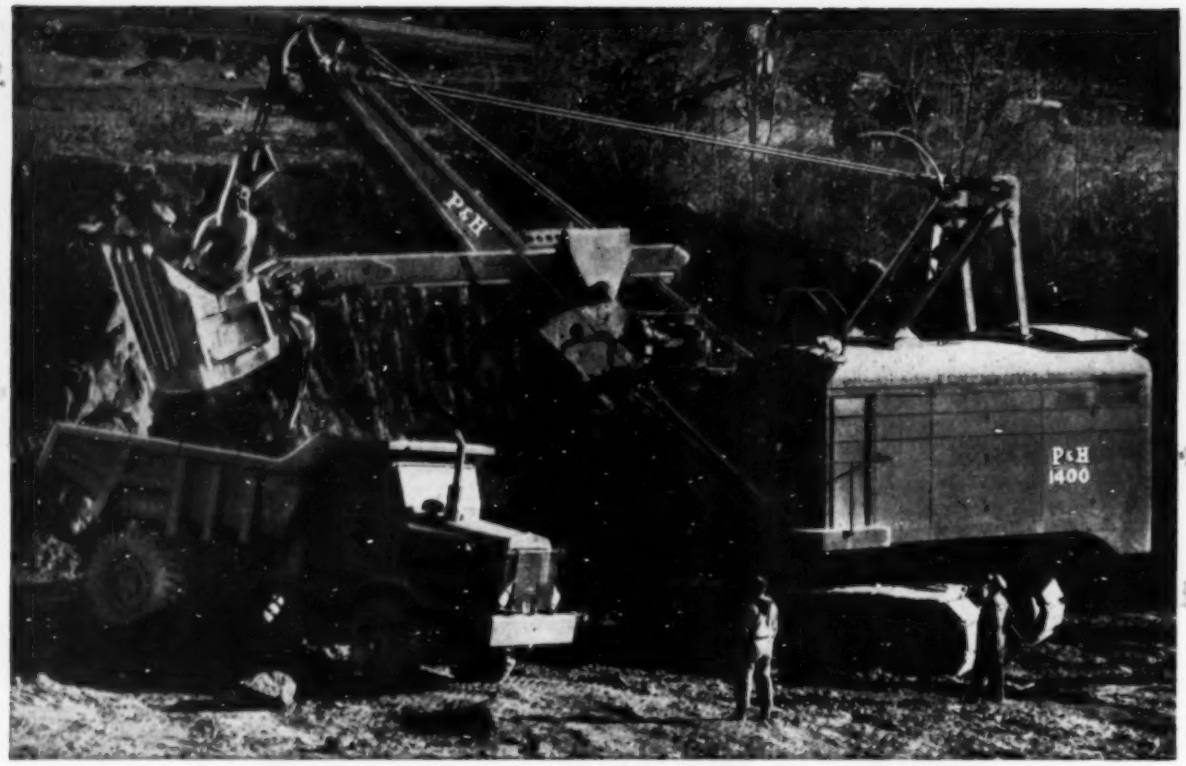

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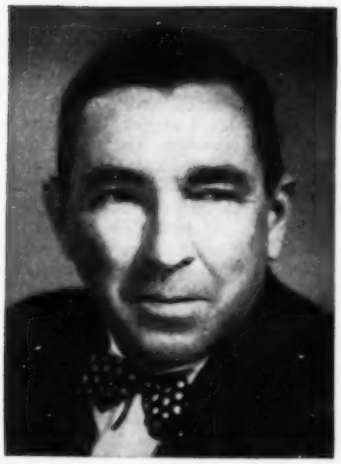

Dyar Heads Maxine Mine

GROSVENOR C. DYAR, former operating vice president, Stith Coal Co., Birmingham, Ala., has been named superintendent of the new Maxine mine, Alabama By-Products Corp., Birmingham. Mr. Dyar is a graduate of the University of Alabama.

president and secretary, was made a vice president in addition to his other duties.

C. M. Watt, president, Loyal Hanna Coal & Coke Co., resigned the presidency April 22, but will remain as a consultant until November, when he will retire. Mr. Watt has served the company for 52 yr. He is succeeded by Winfield S. Weer, general manager since 1944. Mr. Weer joined the company in 1924.

William Brill, chief engineer, Pueblo, Colo. plant since 1950, has been named director of engineering, Colorado Fuel & Iron Corp. A graduate of Johns Hopkins University and Maryland Institute, Mr. Brill joined the company in 1926.

Harold B. Wickey, vice president of operations, Pennsylvania Coal & Coke Corp., has resigned to become vice president, Lehigh Valley Coal Co., Wilkes-Barre, Pa., succeeding Benjamin Henderson. A mining engineering graduate of Penn State, Mr. Wickey has been active in the coal industry since 1933, and during World War II served on the War Production Board. **Russell Herby** has been named general superintendent of mines, Pennsylvania Coal & Coke, succeeding Mr. Wickey.

O. E. Mangus, retiring superintendent, Sagamore colliery, Pocahontas Fuel Co., Inc., McComas, W. Va., was honored May 3 at a banquet given him by his associates. Mr. Mangus joined the company in 1910 as mine foreman, and has been superintendent for the past 10 yr. He has been succeeded by **A. V. Gibson,** who joined the company in 1933 and became general mine foreman in 1945.

W. F. Leatherman, formerly secretary-treasurer, has been promoted to executive vice president, Crozer Coal & Land Co., Bluefield, W. Va. He will continue to serve as treasurer in his new capacity. **L. R. Page** has been named secretary to succeed Mr. Leatherman. **W. E. McQuail,** general manager of the Dott operation, has been made general manager of the Lynco mine.

William Bailey, formerly third-shift foreman, has been named assistant general mine foreman, and **Emmette Bledso,** formerly section foreman, has been promoted to general mine foreman on the third shift, Eccles mine, Eastern Gas & Fuel Associates, Eccles, W. Va.

William A. Fullarton has been appointed special assistant to the president, Pocahontas Fuel Co., Inc., Pocahontas, Va. Since 1951, he served as chief, Solid Fuels Branch, Office of Price Stabilization, in Washington, and prior to that was assistant chief, coal section, Economic Cooperation Administration.

Cyrus Eaton, widely known Cleveland industrialist, last month was elected chairman of the board of the West Kentucky Coal Co., Madisonville, Ky. The Eaton interests are understood to now own approximately 40% of West Kentucky's common stock. At the same meeting, two other representatives of the Eaton organization were elected to the West Kentucky board: **William R. Daley,** of Otis & Co., and **Dr. F. A. LeFevre,** of the Portsmouth Steel Co. Mr. Eaton's son was added to the board earlier this spring. Mr. Eaton's recent affiliation with the West Kentucky Coal Co. ties in logically with his other broad interests in iron ore, lake shipping, steel and railroads, it has been pointed out.

Eugene P. Reed, assistant to the manager of raw materials, since 1952, has been appointed assistant manager of raw materials, Tennessee Coal & Iron Div., U. S. Steel, Birmingham, Ala. Associated with TCI's mining operations since he joined the Birmingham district in 1948 as special engineer at the ore mines and quarries division, he also has worked as superintendent of the Muscoda Div. and has had wide experience in ore mining in both Canada and the U. S., and coal mining in the U. S.

W. H. Bennett, former supervisor, The New River Co., has been appointed safety director, Columbia-Southern Chemical Corp., Midvale, Ohio. He was associated with Leckie Smokeless Coals from 1928 to 1938, worked in various supervisory and safety positions with The New River Co., and was with the U. S. Bureau of Mines prior to joining the chemical firm in 1952 as safety engineer.

Bituminous Coal Research, Inc., has named **A. B. Clymer** administrative engineer on the Columbus, Ohio, staff, to initiate new research projects and design and install administrative systems. Formerly mathematical engineer for the Kimble Glass Co., Toledo, Mr. Clymer holds degrees from Oberlin College, Ohio State University and MIT.

Mitchel Joins P.C.&C.

PENNSYLVANIA COAL & COKE CORP. last month named E. Mitchel, formerly vice president, Simpson Creek Collieries Co., Inc., to the post of vice president—operations. Ernest Stroheim, formerly treasurer, was named vice president and treasurer.

Frank B. King has been appointed administrative assistant to the chief, West Virginia State Department of Mines. With the department since 1949 as mine foreman and fireboss examiner, Mr. King has had 21 yr experience in the West Virginia coal mines.

Bureau Enlarges Staff With 64 New Inspectors

The USBM began a month of intensive training at the end of April for 50 new coal mine inspectors, six mining engineers and eight electrical inspectors added to its staff under a supplemental appropriation act passed by Congress this spring. With the new appointees, the Bureau now has 275 men engaged in coal mine inspection. Following training at the Bureau's Central Experiment Station in Pittsburgh, they are to be assigned to various regional offices. The new appointees and their former company affiliation, together with their expected assignment where available, are:

Coal Mine Inspectors

Birmingham, Ala.—**Ralph B. Jones,** resident engineer and safety director, Youngstown Mines Corp.; **Haskell E. Melhorn,** mine foreman, Fork Mountain Coal Co. Denver, Colo.—**James A. Bennett,** superintendent, Pluto Coal Co. Benton, Ill.—**Maurice R. Messersmith,** mine foreman, Union Pacific Coal Co.

Barbourville, Ky.—**Thomas A. Redin,** general mine foreman, Northwestern Mining Co.; **Clay Pate,** mine foreman, Stith Coal Co. Harlan, Ky.—**Dennie R. Hager,** foreman, West Virginia Coal &

Coke Corp. Madisonville, Ky.—**Ben Julio Dona,** first-aid instructor, Union Pacific Coal Co. Pikeville, Ky.—**Harold R. Baker,** superintendent, Baker Coal Co.; **William R. Burgess,** safety inspector, New River Co.; **Calvin Watson,** general assistant mine foreman, Bethlehem Mines Corp.

St. Clairsville, Ohio—**Don W. Snow,** mine foreman, U. S. Fuel Co.; **John W. Zavora,** assistant mine foreman, U. S. Steel Co.; **John Barry,** industrial engineer, Jones & Laughlin Steel Co. Barnesboro, Pa.—**Norman Rumburg,** assistant foreman, Carbon Fuel Co. Clearfield, Pa.—**Richard H. Reid,** assistant foreman, Sycamore Coal Co. Greensburg, Pa.—**Stacy L. Stiles,** foreman, Brule Smokeless Coal Co.

Johnstown, Pa.—**Gomer Reese Jr.,** superintendent, Mineral Development Corp.; **William O. Montgomery,** general foreman, Tunnelton Coal Corp.; **Deward W. Moore,** section foreman, Powellton Coal Co.; **John A Noon,** division superintendent, New River & Pocahontas Consolidation Coal Co. Pittsburgh, Pa.—**Ernest Long,** shift foreman, Farland Fuel Co.; **Everett Turner,** general superintendent, Old King Mining Co. Punxsutawney, Pa.—**Charles H. Gaskill,** mine foreman, Consolidation Coal Co. (W. Va.).

Uniontown, Pa.—**Griffin L. Lynch,** section foreman, Lillybrook Coal Co. Wilkes-Barre, Pa.—**Robert W. Brown,** assistant mine foreman, Windsor Power House Coal Co.; **Denver S. Griffith,** general foreman, National Mines Corp.; **Herbert R. Bytheway,** mine foreman, Greensburg-Connelsville Coal Co.; **Vernon H. Bowling,** assistant general foreman, Panther Coal Co. of W. Va. Jellico, Tenn.—**John D. Martin,** mine foreman, Johnstown Coal & Coke Co. Salt Lake City, Utah—**Albert C. Husted,** superintendent, Arrowhead Coal Co.

Big Stone Gap, Va.—**Charles C. Cavendish,** operating superintendent, Deep Hollow Coal Co.; **Noah B. Close,** engineer, Sandy Creek Fuel Corp. Norton, Va.—**Walter M. Allen,** construction foreman, TC&I Div., U. S. Steel Co.; **George W. Luke,** shift superintendent, Jones Motor Sales Co. mine; **Andrew E. Zebel,** assistant mine foreman, U. S. Steel Co.; **John J. Pendergast Jr.,** mine foreman, Kemp Coal Co.

Richlands, Va.—**Wayne C. Snyder,** superintendent and general mine foreman, Wallwork Coal Co.; **Charles B. Aspinwall,** mine foreman, Maldenack Coal Co. Fairmont, W. Va.—**William T. Cummings,** mine foreman, Pagnotti Coal Co.; **Louis E. O'Connor,** assistant foreman, Repplier Coal Co. Logan, W. Va.—**Paul T. Akers,** safety engineer, Blue Diamond Coal Co. Montgomery, W. Va.—**Francis H. Henderson,** night mine foreman, National Mines Corp.

Mt. Hope, W. Va.—**Marvin E. Hall,** vice president and general manager, Sport Coal Co.; **Luther A. Lewallen,** safety director, C. H. Mead Coal Co.; **Thomas Allamon,** assistant mine foreman, Republic Steel Corp.; **Anthony Puskas,** mine foreman, Connoquenessing Coal Co. Welch, W. Va.—**Elwood Menta,** mine foreman, Moffat Coal Co.

Electrical Inspectors

Headquarters Not Assigned—**Sanford J. Douglas,** deputy mine inspector, State of Wyoming; **Joseph D. Coleman,** electrician and mechanic, Guyan Machinery Co.; **Carl E. Stinnette,** chief electrician and maintenance superintendent, Hutchinson Coal Co.; **William E. Duke,** mine electrician, Foster 4 and 5 mines, Leechburg Mining Co.; **W. Marion Baker,** maintenance superintendent, Splashdam Coal Corp.; **Fred R. Hilderbrand,** electrician, Dravo Corp.; **Charles E. Estep,** mine electrician, Allegheny River Mining Co.; **James C. Micheli,** electrician and mechanic, Taylor Coal Mining Co.

Health & Safety Engineers

Headquarters Not Assigned—**Russell J. Sholl,** engineer, U. S. Grazing Service and formerly safety engineer, International Smelting & Refining Co.; **Michael J. Gregory,** junior engineer, Bethlehem Mines Corp.; **Anthony J. Fumich,** construction engineer, Christopher Coal Co.; **Frank L. Gaddy,** engineer and section foreman, Warner Collieries Co.; **Robert W. Barnes,** engineer, Warner Collieries Co.; **Elias J. Harris,** assistant mine foreman, Rochester & Pittsburgh Coal Co.

Obituaries

W. E. E. Koepler, former executive secretary, Pocahontas Coal Operators' Association, died May 3, at Fort Lauderdale, Fla. Widely known throughout the industry, Mr. Koepler was the association's first secretary, serving in that post for 33 yr until his retirement Dec. 31, 1951. He was one of the originators of the Southern Appalachian Industrial Exhibit, held every 2 yr at Bluefield, W. Va. Prior to joining the association, he was associated with *Colliery Engineer* and *Black Diamond* magazines.

Clyde English, 62, chief clerk, Pittsburgh Consolidation Coal Co., died April 14 at his home in Robinson Township, Pennsylvania. He had been associated with the company for 33 yr.

J. A. Dickinson, 65, president, Mahan Ellison Coal Corp., Southern Harlan Coal Co. and director of Southern Coal & Coke Co., recently died in Louisville, Ky.

Lee R. Christopher, 53, vice president, Christopher Fuel Co., Morgantown, W. Va., died May 12, in Winchester, Va., after a long illness. Throughout his 25 yr in the coal industry, he was closely associated with his brother and served as vice president of the various companies in which the two were active.

Association Activities

W. Pa. Coal Group Meets

At the annual meeting of the membership of the Western Pennsylvania Coal Operators' Association, held April 23 at Pittsburgh, the following directors were elected: Charles B. Baton; J. Allan Brookes; F. H. Coleman; J. M. Connor; J. E. Elkin; H. C. Goodhart; Wenman A. Hicks; James R. Jamison; W. A. McBride; C. C. McGregor; C. W. Pollock; Henry C. Rose; Walter F. Schulten; G. A. Shoemaker; E. A. Siemon; G. C. Trevorrow and F. G. West. At the organizational meeting which followed, G. A. Shoemaker was elected president; Charles B. Baton, vice president; Harry A. Sutter, executive vice president; M C. Briggs, treasurer, and Earl Glass, secretary. Members of the executive, legislative, research, scale and traffic committees also were elected at the meeting at which 95% of the tonnage of the association was represented.

Ohio Coal Elects Officers

The following officers were elected at the annual meeting of the Ohio Coal Association in Cleveland, April 20: P. C. Beutel, chairman of the board and president; George M. Jones Jr., vice president; E. H. Miller, secretary-treasurer. Ezra Van Horn was elected executive vice president for the 21st consecutive year. Directors named included Mr. Beutel, Mr. Jones, E. H. Davis, W. D. Hamilton, R. L. Ireland, S. B. Johnson, Merl C. Kelce, Harold E. Turner and Whitney Warner, Jr. Tom Pickett, NCA executive vice president and principal speaker at the luncheon, spoke on the effect imported residual fuel oil has upon the coal industry.

NCA Closes Chicago Office

In line with a recent executive committee action, the Chicago office of the National Coal Association has been officially closed. Marc Bluth, manager of the Chicago office for more than 20 yr, has joined the Washington staff as program coordinator for the Midwest Div. in the foreign oil campaign. Mr. Bluth, who for many years also had served as executive secretary of the Stoker Manufacturers' Association resigned that post, effective May 1. He will continue in an advisory and consulting capacity with the stoker association, however, and will assist in setting up an office in Washington for that organization, which is transferring its headquarters from Chicago.

Safety Council Sets Record

In setting an outstanding safety record in 1952, for which the Allegheny Valley Council received special recognition from the Joseph A. Holmes Safety Association, member companies deep-mined more than 6 million tons and worked 7.9 million man-hours without a fatal accident. During the year, the Council had 157 lost-time accidents, for a frequency rate of 19.81 lost-time accidents per million man-hours. The following mines made up the council: Republic Steel Corp., Indianola, Russellton and Newfield mines; Harmar Coal Co., Harmar and Oakmont mines; Allegheny Pittsburgh Coal Co., Springdale mine; Renton Coal Co., Renton mine; Butler Consolidated Coal Co., Wildwood mine; and Duquesne Light Co., Harwick mine. Indianola mine led the group with only two lost-time accidents during 1952, operating 542,000 man-hours for a frequency rate of 3.69 per million man-hours.

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Standard Rivetless Chain available in 4" to 9" pitches to fit standard equipment.

The more it's used the harder it gets!

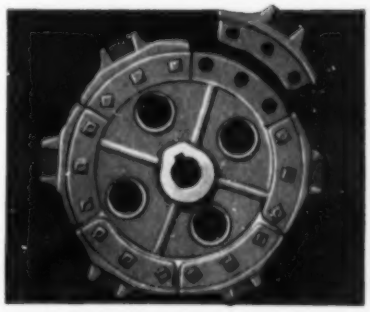
That's because it's made from KENKROME, the remarkable wear-defying alloy that was perfected after years of experimentation by Kensington engineers and metallurgists.

KENKROME is no ordinary steel ... in fact it's no ordinary manganese steel. There's no other steel quite like it.

Addition of special alloying metals under a patented process, plus Kensington's own scientific method of heat treatment, have created this remarkable metal which outwears ordinary steel *2 to 4 times*... which actually defies wear by developing surface hardness under impact to better enable it to withstand abrasion. Beneath this continually hardening surface, the metal always remains tough ... better able to withstand shock than metals that are hard all the way through.

But Kensington's wear-conquering engineers didn't stop with development of the metal itself. They improved the design of many standard parts ... reinforced those which needed strengthening ... reduced the number of moving and wearing parts on some ... reshaped others to add extra service life.

The renewable tooth sprocket, shown at the right, is a good example of Kensington's improved design. When outer segments need replacing, the entire change can be completed by a couple of men during lunch hour ... without even removing the chain. A new set of teeth costs only a fraction of what you'd pay for a complete one-piece sprocket.



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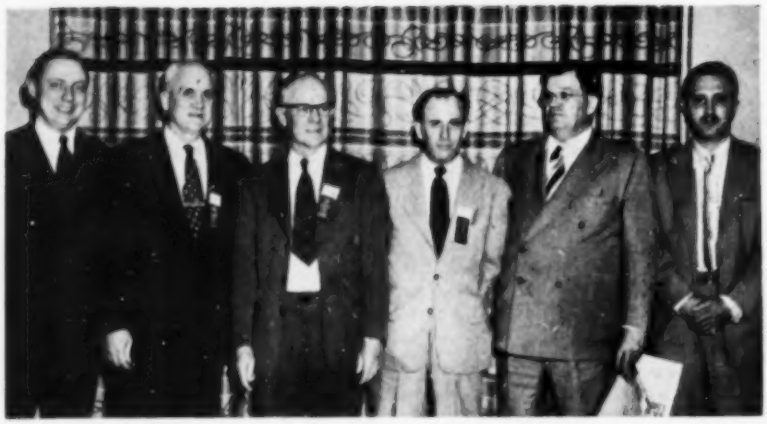
Sprocket Information { CHAIN NO. ____ NO. TEETH ____ SHAFT DIA. ____ ; HUB LENGTH ____ ☐ CENTRAL ☐ OFFSET ☐ KEYWAY ☐ BUSHED ____

NAME ____

COMPANY ____

ADDRESS ____

CITY ____ ZONE ____ STATE ____



PARTICIPANTS in mining sessions of the 19th annual West Virginia State-Wide Safety Conference were: J. T. Ryan Jr. (left), president, Mine Safety Appliances Co.; Crawford L. Wilson, safety engineer, New River & Pocahontas Coal Co.; C. E. Jones, safety engineer, District 29, UMWA; Charles V. Miller, district manager, Mine Safety Appliances Co.; George J. Titler, president, District 29, UMWA; Harry F. Weaver, chief, Coal Mine Inspection Branch, USBM.

W. Va. Mining Men Attend State Safety Conference

SAFETY PROGRESS may be more difficult from here on in because the industry has accomplished the easier things, such as taking care of the points brought out by federal, state and union inspectors, C. R. Bourland, vice president, operations, The New River Co., indicated in an opening address before the Mines and Mining Section at the 19th annual State-Wide Safety Conference of the West Virginia Safety Council, held in Charleston, April 22.

Other speakers at the mining sessions were: Harry F. Weaver, chief, Coal Mine Inspection Branch, USBM; G. R. Spindler, director, School of Mines, West Virginia University; J. T. Ryan, Jr., president, Mine Safety Appliances Co.; and George J. Titler, president, District 29, UMWA.

The meeting was under the guidance of Crawford L. Wilson, safety engineer, New River & Pocahontas Coal Co., Minden, as chairman, and C. E. Jones, safety engineer, District 29, UMWA, as co-chairman. Chairmen of the two sessions were Mr. Jones and Charles V. Miller, district manager, Mine Safety Appliances Co., Bluefield.

Mr. Bourland said that the problem ahead is to train men so that, through habit, they will do the job safely. Job training means not general instructions, which may be worse than useless, but rather going into the mining section and showing the men the safe way. "If a man knew what to do he would do it," he emphasized.

Mr. Weaver read a paper, "Federal Bureau of Mines Views on National Coal Mine Safety," prepared by James Westfield, chief, Health & Safety Branch, USBM. The paper reviewed coal-mine disasters leading to establishment of the bureau and finally to the Coal Mines Act of 1952, and then discussed accident records and experiences in enforcing the Act.

Only one major disaster has taken place since the Act went into effect, the paper pointed out. That was an explosion in an Iowa mine from the use of black powder. So far, the bureau has issued only eight withdrawal orders and none has been appealed to the Coal Mine Board of Review. The paper concluded with the observation that the most important factor in safety is what a coal operator does during the 12 mo or so between federal inspections. Four states, Wyoming, Washington, Oklahoma and North Dakota, have entered into cooperative inspection agreements with the Bureau and similar agreements are pending with North Carolina and Alaska.

Safety is a way of living and education is the keynote, Mr. Spindler emphasized. Since inspections are periodic and cannot provide day-to-day safety, men must be indoctrinated to achieve a full appreciation of safety. Supervisors not only have to be skilled in work but also skilled in teaching their workmen. They have to develop a superior ability to get others to do certain things. Any engineering curriculum should include a course in safety, Mr. Spindler concluded. Summing up, at the end of the afternoon session, Chairman Wilson said, "Safety is everybody's business."

Mr. Ryan, in his talk, "State and National Mining Sets New Record in 1952," presented graphs showing fatality trends since 1930 in relation to locations and causes. The 1952 all-time low record is a continuation of a downward trend started in 1944. Although the records do not as yet indicate roof-fall improvement, Mr. Ryan said that the industry has made great strides in that phase of safety and there is every indication that 1953 and 1954 will record a major improvement. A particularly pointed sentence in his address was: "Today an unsafe mine cannot be operated."

Mr. Titler maintained that safety was hit below the belt by proposed removal of J. J. Forbes from the directorship of the USBM, but added, "Whatever happens in Washington, we intend to go on with our safety program." At the outset of his talk, he paid tribute to the federal coal mine inspection department.

It was in 1946 that District 29 set up a safety department and employed C. E. Jones as safety engineer. Fatalities in the district numbered 117 in 1945. In 1946 that total was reduced by 18, in 1947 by 1, in 1948 by 21, and in the year 1952 fatalities in the district was 65. Mr. Titler said that a man trained in first aid has only a 25% chance of being injured, as compared to the untrained. Since 1947, when the USBM 20-hr courses were started 67,790 men in District 29 have been trained.

Mr. Titler emphasized that a safe worker must be safety conscious all the time he is doing his work. "If it is kept instilled in the worker's mind that he is surrounded by danger," he told the operators, "you won't have half of the mine accidents." State of mind has a lot to do with it. Trouble at home and sickness cause men to have accidents, and they suffer more accidents during slack time.

Old Timers' Club Cites Kentucky Engineering Senior

JAMES ROBERT STEWART (left), Loyall, Ky., a senior in the University of Kentucky's College of Engineering, receives the annual Old Timers' Club award from Charles W. Connor, Defense Solid Fuels Administrator. The gold watch award is given each year to the UK's outstanding senior in mining engineering by the organization of veteran coal operators and mining machinery manufacturers to encourage scholarship among mining students. The presentation was made April 16 at an engineering assembly program at which Mr. Connor was the speaker.

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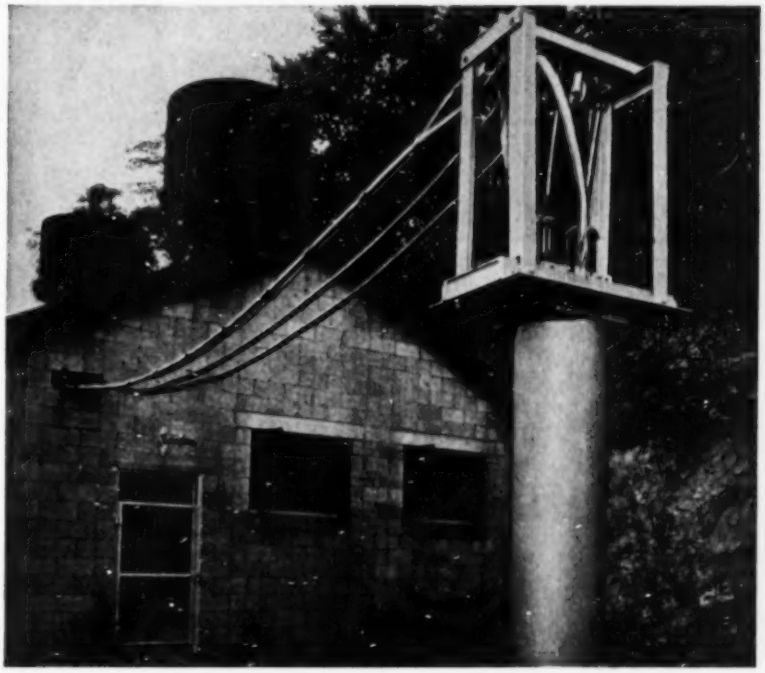

● Insulated aluminum cable costs *less* than copper cable and *far less* than armored copper cable. Aluminum needs no supporting armor because it can easily support its own light weight in boreholes of great depth. A 500,000 CM insulated aluminum cable is *less than half* the weight of an identical copper cable. It is furthermore easier to handle and its light weight speeds up every operation connected with its installation. It also makes possible fewer, simpler lower-cost supports.

United States Rubber Company is the only manufacturer of wire and cable that grows its own natural rubber and makes its own synthetic rubber and plastics. This quality control means the ultimate in electrical insulation.

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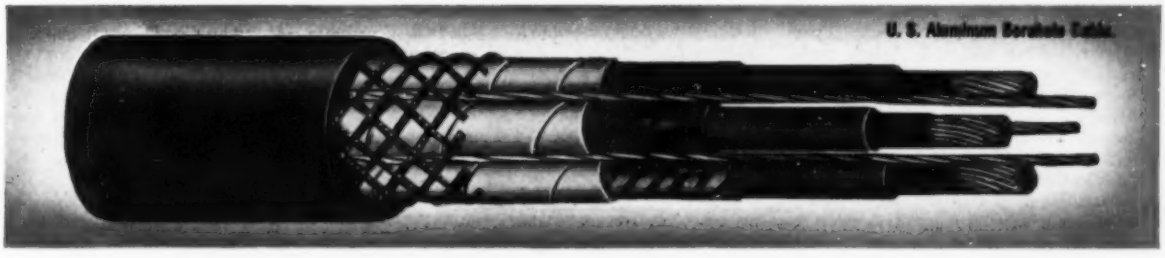
	Open-Air Current-Carrying Capacity Amperes		Weight Per 1,000 Ft., Pounds		Resistance 1,000 Ft., 25 Deg. C Ohms	
	RH Copper	RH Aluminum	RH Copper	RH Aluminum	Copper	Aluminum
2/0.....	225	222	541	274	0.0842	0.134
4/0.....	300	302	816	380	0.0525	0.0843
500,000.....	515	520	1,831	787	0.0222	0.0357
750,000.....	655	660	2,716	1,129	0.0148	0.0238
1,000,000.....	780	785	3,546	1,437	0.0111	0.0178
1,250,000.....	890	895	4,400	1,699	0.0089	0.0145



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HIGH BTU GAS, COKE, ACTIVE CARBON, TOBACCO CURING: J. D. Clendenin (left), USBM, Schuylkill Haven, Pa.; J. W. Hassler, West Virginia Pulp & Paper Co., Tyrone, Pa.; P. F. White, Anthracite Institute, Philadelphia; and L. L. Newman, USBM, Washington.

MINING AND PREPARATION: David B. Baird (left), Philadelphia & Reading Coal & Iron Co., Pottsville, Pa.; C. A. Garner, Jeddo Highland Coal Co., Jeddo, Pa.; David J. Crawford, Lehigh Navigation Coal Co., Lansford, Pa., and F. W. Earnest, Anthracite Institute, Wilkes-Barre, Pa.

Fuel and non-fuel uses surveyed at 11th annual . . .

Lehigh Anthracite Conference

More effective utilization in domestic heating, prospects for anthracite in the high-Btu gas field, higher productivity through better mining methods, and germanium concentrations in anthracite veins leading conference topics.

A POSITIVE APPROACH to merchandising and accelerated research in the mining and utilization of anthracite were major themes at the 11th annual Anthracite Conference at Lehigh University, Bethlehem, Pa., May 7-8. Over 200 registrants, representing producing companies, distributors, equipment manufacturers and research organizations participated in the 2-day program. Acting chairman was Dr. A. W. Brune, assistant professor, mining engineering, Lehigh University.

At the Thursday morning session, speakers and their subjects were: "Pyramid Grates," by Henry K. Eilers, president, Pyramid Grate Co., New York; "Stoker Design—A Challenge to the Coal Industry," by L. C. Dubs, president, Canton Stoker Corp., Canton, Ohio; "Some Aspects of Air Pollution," by Dr. L. C. McCabe, chief, fuels and explosives division, U. S. Bureau of Mines, Washington; and "Blueprint for Better Advertising," by Miss Lillian Cohen, advertising manager, Lehigh Navigation Coal Co., Inc., Philadelphia. Session chairman was W. R. Dougan, general sales manager, Philadelphia & Reading Coal & Iron Co., Philadelphia.

Pyramid-type grates facilitate deep firing of the steam sizes of anthracite in low-pressure boilers, Mr. Eilers said, because primary air is introduced horizontally in large volume at low velocity. The design of the grate, which features a pierced pyramid over each of the inlet ports, also is effective in preventing sifting of the fine sizes. Other advantages are: longer intervals between firings, thus reducing attendance time; better hold-fire characteristics; elimination of "backfires" when starting up with forced-draft fans; and more constant level of temperature throughout the day, which eliminates early-morning forcing.

On costs of installation, Mr. Eilers said that a single boiler designed for this long-firing system costs approximately $15 per boiler horsepower, and a twin-boiler installation costs about $12 per boiler horsepower. Residual-oil burners with tanks average from $40 to $50 per boiler horsepower. Schools, apartment houses and other commercial-heating applications provide the principal opportunities for sales of the long-firing system, Mr. Eilers said.

Stoker-design research is a challenge to the entire industry, Mr. Dubs declared,

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

in pointing out that increasing labor costs, reduced productivity in the boilerroom, and the automaticity of competing equipment make it mandatory that stokers, complete with a package of combustion controls, be provided for all possible applications. Both manufacturers and producers must take steps to provide a team of full-time research men to apply the wealth of information already available and to search out new knowledge of combustion control. While the long-term prospects for coal appear to be bright, Mr. Dubs declared, a co-operative effort among the units in the industry will be required to promote the development of this bright future.

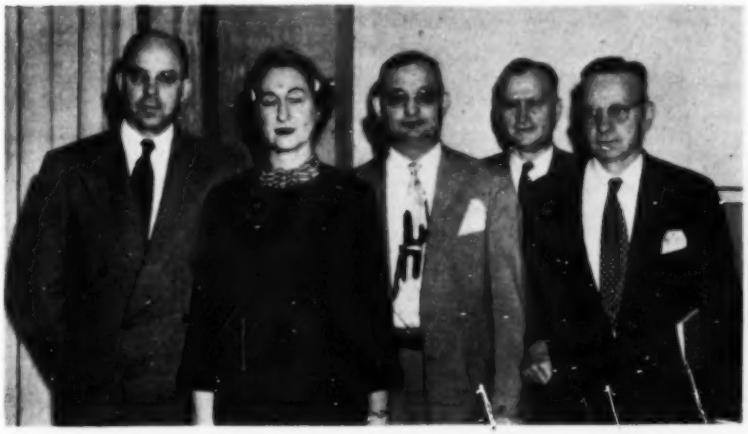
Industrial expansion in the past 12 yr, and particularly the location of industry in new areas, has spread the problem of air pollution to areas where it has not been experienced previously, Dr. McCabe said, in pointing out that at present professional interest in air-pollution control extends into agriculture, chemistry, medicine, meteorology, engineering, physics and law.

Topographic features have a direct bearing on the intensity of pollution, Dr. McCabe stated, and were it not for the benefits of water supply and transportation, valleys might profitably be avoided as industrial sites.

Using slides to illustrate conditions in the Los Angeles area, Dr. McCabe pointed out that temperature inversion, a meteorological phenomenon, is effective in trapping and holding pollutants in a ground-level layer. Therefore detailed meteorological data, not available in many areas, is essential to an effective program of air-pollution control.

Furthermore, pollution is having a bad effect on truck-farm economics in the Los

TRACE ELEMENTS, STOKER SERVICE: A. W. Brune (left), Lehigh University, Bethlehem, Pa.; Tusten Van Duzer, MotorStokor Sales Co., Warwick, N. Y.; J. B. Warriner, Lehigh Navigation Coal Co., Philadelphia; A. G. Mayer, Toker Coal Co., Elizabeth, N. J.; R. C. Johnson, Anthracite Institute, Wilkes-Barre, Pa., and C. C. Wright, Pennsylvania State College, State College, Pa.



BURNER DESIGN, CLEAN AIR, BETTER ADVERTISING: L. C. McCabe(left), Bureau of Mines, Washington, D. C.; Miss Lillian Cohen, Lehigh Navigation Coal Co., Philadelphia; L. C. Dubs, Canton Stoker Corp., Canton, Ohio; W. R. Dougan, Phila. & Rdg. Coal & Iron Co., Philadelphia; and H. K. Eilers, Pyramid Grate Co., New York.

Angeles environs. A single bad day has resulted in the ruin of many acres of such produce as spinach and lettuce on more than one occasion. And we still require intensive research into the effects of pollutants on the health of the population, Dr. McCabe declared. He concluded that the technical assistance which the anthracite industry can provide can be a significant factor in cleaner atmospheres for cities in the anthracite market area.

A blueprint for better advertising and selling, Miss Cohen said, must take in these five important factors: the product, the market, the medium, the message, and the merchandising.

The advertiser must know exactly and completely what his product is and what it does. He must know who uses it and who might possibly use it. In choosing media to carry his message, he may resort to any or all of the following: newspapers, radio, television, direct mail, outdoor advertising or telephone. His message in most instances must include copy and illustrations that reflect imagination in a layout that attracts reader interest.

The final step, merchandising, means having the right product in the right place at the right time at the right price.

"We are now in the midst of the best time to merchandise anthracite—during the spring and summer when there are such decided advantages both to the dealer and to the consumer," Miss Cohen declared.

At the Thursday afternoon session, with J. B. Warriner, senior director, Lehigh Navigation Coal Co., Inc., Philadelphia, presiding, speakers and their subjects were: Dr. C. C. Wright, chief, Division of Fuel Technology, Pennsylvania State College, State College, Pa., "Spectrographic Analysis of Anthracite for Trace Elements"; Dr. R. C. Johnson, vice president—research, Anthracite Institute, Wilkes-Barre, Pa., "AnthraAid, a New Carbonaceous Filter Aid"; T. Van Duzer, owner, MotorStokor Sales Co., Warwick, N. Y., "How to Survive on Stoker Service"; and A. G. Mayer, sales manager, Toker Coal Co., Elizabeth, N. J., "We Can't Sell Stokers, But We Do."

In his informal presentation of a paper jointly authored with R. C. Nunn, research assistant, and H. L. Lovell, spectroscopist, Pennsylvania State College, State College, Pa., Dr. Wright explained that in 1950 an investigation was initiated at Penn State with these three objectives:

1. To develop standards which can be used in the spectrographic analysis of anthracite ash.

2. To make a general survey of the ash composition, including minor and trace elements, for the major seams and fields of the region.

3. To make specific surveys pertaining to the occurrence and concentration of certain elements of immediate interest and importance to the industry.

The third objective has had major emphasis because of widespread interest in possible sources of germanium, an element having controllably versatile electrical properties.

After describing the methods of spectrographic analysis used at Penn State, Dr. Wright reported that the Wilkes-Barre area in general and the Ross seam in that area in particular showed the highest concentrations of germanium in the preliminary studies.

Also, the higher concentrations generally were found near the bottom of the seam, substantiating the findings of other investigators. In a localized area, the Ross-seam ash showed a germanium oxide concentration of 0.040%, which is on the borderline of inviting commercial interest. However, there is a question as to the advisability of selectively mining this seam in this area because the germanium values occur in such a narrow band.

Several samples of flyash from anthracite-burning boilers have been analyzed and found to contain from 2 to 3 times the amount of germanium than the ash itself, Dr. Wright reported. Furthermore, higher concentrations might be present in the fumes and flyash escaping from the stack, in view of the volatile nature of the material.

Dr. Johnson presented a preliminary report on the status of research into the development of improved filter aids made of anthracite fines.

The failure or withdrawal of other companies from the stoker field, Mr. Van Duzer said, left many stoker owners in Orange County, N. Y., without service, thus making it necessary for his company to expand to handle the needs of these owners. Providing this service also was necessary to retain customers for coal in the area.

In planning to put service on a profitable basis and to welcome this kind of business, Mr. Van Duzer reported that his company's emergency service consists of "unit replacement" methods to cut

NEW Model HUD Disconnecting Hydraulic Power Take-Off . . .

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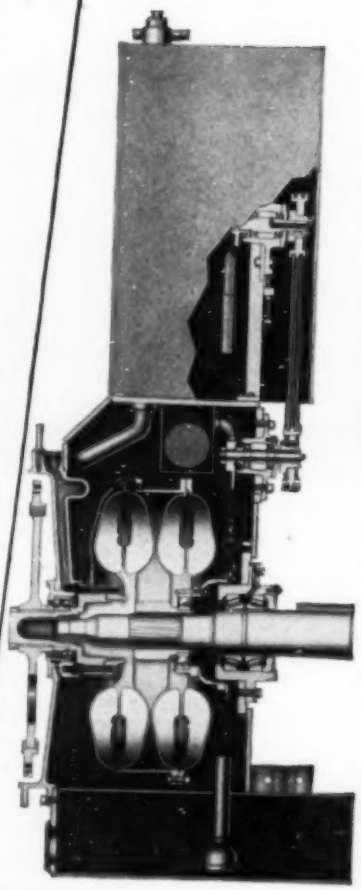
Doubling wear life on chains, clutches and running parts, drilling rigs equipped with the new Twin Disc Disconnecting Hydraulic Power Take-Offs have been running up outstanding service records during the past two years. Many rigs now drill deeper, more economically, because the new Twin Disc Model HUD allows the *full use of peak engine torque* . . . dampens starting shocks, stopping shocks and overloads. Through the complete Disconnect feature, the HUD acts as a master clutch.

Steady power transmission through Twin Disc HUD softens and controls speeds of acceleration and deceleration . . . to reduce impact shock—on power units *and* driven equipment—by 70% or more. Compounded drives can easily be synchronized—drum clutches can safely be engaged with engines idling, for smoother load pick-up—the range of available mud pump speeds and pressures can be greatly extended. Rig engines, free to run at their most efficient rpm, *prevented* from lugging or stalling under load, are assured of a longer, more serviceable, trouble-free life.

For complete information on how Twin Disc Disconnecting Hydraulic Power Take-Offs are adding efficiency to modern drilling rigs, contact your nearest Twin Disc Factory Branch, or write to the Hydraulic Division, Rockford, Ill.



Twin Disc Model HUD Disconnecting Hydraulic Power Take-Off—available in coupling sizes 21" and 27"; to handle 60 to 600 hp engines . . . operates with either cooling radiator or heat exchanger . . . incorporates shortened oil sump to fit rig design.

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down on costs to the customer primarily. Much emergency service requires overtime labor, so the unit-replacement system results in shorter calls. The unit which has been removed may then be repaired at the most opportune time in the company's shop.

A complete file of installation work sheets is indispensable, Mr. Van Duzer pointed out, if the work of servicing a burner is to be done efficiently and quickly. The serviceman consults the work sheet before making his call so that he may equip himself to handle the job ahead of him. Again, the result is lower cost to the customer.

A second type of service is the annual check-up or inspection. "To say we go after this business aggressively is putting it mildly," Mr. Van Duzer said. On or about May 1, a letter is sent to each customer, setting forth the benefits of such service. A return postcard is enclosed to permit the customer to take advantage of the service.

In 1952, this annual service covered 86% of the stoker users in the territory, and the other 14% includes many mills and factories who already have competent maintenance personnel.

"Being a neophyte in this business," Mr. Mayer said, "I had no idea how badly stokers had been sold or serviced and what a miserable reputation they had. . . . We immediately stopped selling 'stokers' and started selling the 'amazing new Electric Furnace-Man fully automatic heating units.'"

Aggressive advertising and hard selling resulted in keeping a number of coal customers who had their minds made up to convert, Mr. Mayer said.

Installation must be perfect, however, since the customer was "sold" a unit and may be critical and sensitive of any service difficulties. The job of "nursing" these accounts is costly, Mr. Mayer said, but each becomes a center of influence that might convince others to adopt automatic coal-fired heat.

Mr. Mayer also commended the services rendered by field representatives of Anthracite Institute, who have helped some commercial users solve problems in their use of anthracite.

Friday-morning speakers were: L. L. Newman, gas engineer, Fuels and Explosives Div., USBM, Washington, "High Btu Gas from Anthracite"; J. W. Hassler, director of research, Industrial Chemical Sales Div., West Virginia Pulp & Paper Co., Tyrone, Pa., "Preparation and Application of Active Carbon"; J. D. Clendenin, chief, Preparation and Utilization Branch, USBM Anthracite Research Laboratory, Schuylkill Haven, Pa., "Blending of Anthrafines in Coke Production", and P. F. White, consulting engineer, Anthracite Institute, Philadelphia, "Curing Tobacco with Anthracite." Dr. Johnson presided.

Noting the continuing drop in consumption of anthracite for the production of carburetted water gas, Mr. Newman declared that while immediate prospects for reversing this trend are gloomy, the long-range view is more hopeful. Since anthracite is close to the major gas-using territories, it may expect to fill much of

the gap as natural-gas reserves and other sources of high-Btu gas diminish. However, the cost of anthracite will have to be about equal to that of bituminous coal.

In analyzing the probable costs of the various processes for making the primary synthesis gas, Mr. Newman favored either the Lurgi process charged with pellets or a system of gasifying pulverized silt under pressure. In view of many unanswered questions on the production of pellets and the gasification of finely ground silt, the gasification of prepared sizes, such as No. 2 buckwheat or rough-screened run-of-mine, in fixed-bed generators operating under high pressure, as in the Lurgi process, also must be considered for the future manufacture of high-Btu gas as a supplement or substitute for natural gas, Mr. Newman said.

In summarizing authoritative opinion, Mr. Newman pointed out that projects relating to coal gasification and the synthesis of a substitute natural gas should be undertaken on a larger scale. Last year, 60% of the $513,000 spent on research by the Institute of Gas Technology was spent in one broad field, natural-gas substitutes, and coal has had its share of the Institute's attention.

For the anthracite industry, the principal problem in getting its fair share of the inevitable future market that will result from high-Btu gas production will be to meet the competition of bituminous coal, with due allowance for differences in processing costs and proximity to the market for the gas, Mr. Newman declared. To have a share in providing the preferred fuel of the near future—natural gas or a substitute—gasification research by the solid-fuels industries is necessary, Mr. Newman concluded.

Explaining that active carbon is a purification agent to be used when distillation, crystallization and other familiar methods of purification are not applicable, Dr. Hassler pointed out that almost any kind of carbonaceous material can be converted into active carbon. However, for industrial purposes, sources of raw materials are limited. The yield is only from 10% to 60% of active carbon from the material available for carbonization; therefore, the raw materials should be available in large quantity in a relatively small geographical area.

After describing the preparation and applications of active carbon, Dr. Hassler pointed out that the carbonization and activation of different raw materials results in a variety of active carbons, each with a greater affinity for one absorbable substance than for all others. Manufacturers of active carbon must test their product to find the market it will most adequately serve, Dr. Hassler said.

In his review of continuing studies into the use of anthrafines in coke production, a report jointly authored with Joseph Kohlberg, chief chemist, Missouri Coke & Chemicals Division, Great Lakes Carbon Corp., St. Louis, Mo., Mr. Clendenin pointed out that expanded efforts are being made in coal blending and other practices aimed at improving coke quality to offset steady deterioration in the quality of many coking coals.

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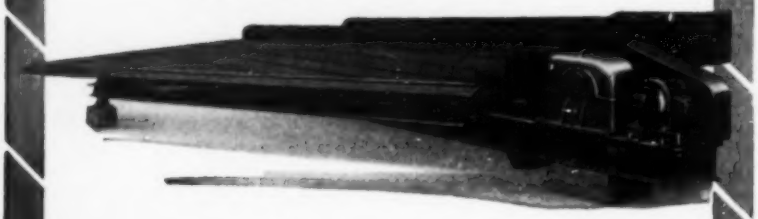

On an Eastern Kentucky coal, SuperDuty Diagonal Deck Coal Washing Tables are maintaining gratifying results, month by month, treating 1/4" x 0 size fines with such thoroughness that cleaning efficiency is sustained at 99.8% with capacity at 160 tons per hour.

In the handling of difficult Pocahontas fines at similar high capacity, efficiency averages 99.3%. Compare that with your own performance and figure for yourself how quickly the difference can amortize new SuperDuty equipment and pay continuing profits. No modern coal mine should be satisfied with anything less than SuperDuty cleaning efficiency.

For full information, request Bulletin 119.

FOR THAT HEADACHE — FINE MESH SCREENING . . .

For special problems of dry screening of damp materials at meshes unusually finer than previously employed, the Leahy Screen equipped with FlexElex is recommended. The electrically heated screen cloth of this equipment offers fast, efficient screening at acceptable operating costs.

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The use of anthrafines need not mean an inevitable rise in breeze production, Mr. Clendenin said, and shatter tests show that anthracite-bearing cokes stand up quite as well as cokes free of anthracite. Also, experimental evidence is presented to demonstrate that small percentages of anthrafines in the coking mix can give substantial reductions in oven pressure at essentially constant bulk density of the charge to the oven, Mr. Clendenin said. It is clear that the blending of anthrafines in coke production is gaining new adherents, Mr. Clendenin concluded.

In describing the use of anthracite in open-curing of tobacco, Mr. White stated that three co-operating farmers found that tobacco from a poor crop turned out well and brought a high price and that objectionable spotting and odor both were negligible.

In Canadian practice, Mr. White reported, fuel costs for curing with anthracite were lower than with any other fuel.

In 1952, the Oxford Tobacco Research Station at North Carolina State College began investigation to improve curing with anthracite while eliminating spotting of the leaf, if possible, Mr. White said.

At the final session, Friday afternoon, with C. A. Garner, vice president, Jeddo Highland Coal Co., Jeddo, Pa., presiding, speakers and their subjects were: Kenneth E. Sanger, fuel engineer, Percival R. Moses & Associates, New York, N. Y., "A Fuel Economy Survey of New York City Fuel Burning Plants"; David J. Crawford, mining research engineer, Lehigh Navigation Coal Co., Inc., Lansford, Pa., "A Mining Research Program for Anthracite"; and David B. Baird, chief coal inspector, Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., "Quality Control of Product and Raw Feeds."

In reporting on his firm's recommendations on fuel use to the Mayor's Committee on Management (New York City), Mr. Sanger pointed out that only in a few instances was it recommended that coal-fired city plants be converted to oil. In many cases, plants burning broken, egg, stove and nut anthracite were suggested for conversion to deep-firing of Buckwheat No. 2, as an efficiency-raising and economy measure. In other instances, conversion to mechanically-fired Buckwheat No. 2 was advised. Total savings to the city through better choice of fuels and better operation of city-owned plants would amount to more than $800,000 per yr, Mr. Sanger said.

In offering ideas for better mining to improve anthracite's employee productivity, Mr. Crawford reported on Lehigh Navigation's investigations during the past 3 yr into longhole methods. Sparked by the development of tungsten-carbide-tipped bits and new drill rods, interest in longholing was revived even though earlier experiments had been discontinued, Mr. Crawford explained.

The plan for recovering the coal, which pitches at 45 deg, required the driving of a drill heading in rock parallel to the haulageway, Mr. Crawford said, with rock loading chutes on 60-ft centers connected by rock slants underneath the

bottom rock of the vein and rock taps on 20-ft centers from the rock slants for running the coal. Concurrent with this development, a conventional breast was driven through to the level above to provide a free face for the long hole shooting.

After the opening breast was driven through, a ring of holes was drilled from the rock heading 10 ft in by the rib of the opening breast. These were fanned out and drilled through the intervening rock to hole into the gob area or the top rock in the seam. Later the method was changed to permit drilling from the coal taps. The drill is a Jeffrey A-6 with compressed-air motor, and auger sections are 2 ft long.

Enough coal was withdrawn after each shot to permit room for expansion before blasting the next round. Later, another breast was driven off each fourth chute to provide additional longhole working places.

Explosives consist of 1¼x8-in cartridges in paper shells 24 in long, distributed according to the burden on the particular holes and proximity of the holes to each other. Plastic-covered Primacord is inserted throughout the length of each charge to insure complete detonation. Corrugated asbestos plugs are used for tamping, and a 50-cap blasting machine detonates the charge. The firing station is located at least 1,000 ft from the shot with at least two right angle turns between the shot and the station.

Among the anticipated benefits, Mr. Crawford listed the following: improved production per man shift, more uniform daily production, less contamination of the coal, lower cost, better working conditions, and less training required, thus contributing to the maintenance of an adequate working force.

In the final paper, Mr. Baird declared that quality control of the breaker product is essential if the retailer is to continue to move the prepared sizes which have provided much of the industry's profit. Good appearance, uniform sizing, freedom from bone and slate insofar as possible, as well as uniformity in ash content lead to market acceptance. Keeping within various specifications set up for anthracite also is necessary, Mr. Baird explained.

Furthermore, a detailed daily knowledge of the quality of the raw feed from each source is of paramount importance. This is particularly important in the case of salvage strippings or those sources which are prone to fluctuate, Mr. Baird said. One producer follows the practice of sampling the feed by removing a cross-section of the feed from the loading conveyor. Accumulated samples then are immediately tested to insure the most efficient operation of the cleaning plant. In addition, the reports prepared from analyses of these samples are used by the accounting and operating departments of the company in controlling costs and policing the operations for quality maintenance.

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- Lower investment compared with new mining machines.
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Write today for complete facts on converting your track mounted equipment.

A 30-YD ELECTRIC SHOVEL in operation was one of the highlights of the Sixth Annual High School Seniors' Day, held at the Skyline mine of the United Electric Coal Cos., Evanston, Ky. Sponsored by the Big Sandy-Elkhorn Coal Mining Institute, the annual event is planned to acquaint graduating students with opportunities in coal mining.

COAL COMPANY OFFICIALS present to greet the boys (right photo) included: George Evans Jr. (left), president and general manager, Glo Valley Coal Co.; J. H. Mosgrove, safety director, Big Sandy-Elkhorn Coal Mining Institute; M. M. McCormick, superintendent, Elkhorn No. 3 mine, Pond Creek Pocahontas Co.; A. M. Ayres, general superintendent, Russell Fork Coal Co.; David Bayer, manager, Kentucky-Elkhorn Div., Pond Creek Pocahontas Co.; M. E. Prunty, safety director, Consolidation Coal Co. (Ky.), and institute president; Arthur Bradbury, safety director, Inland Steel Co.; and L. M. Barco, general superintendent, United Electric Coal Cos., who served as host.

School Seniors View Kentucky Stripping

NEARLY 200 BOYS visited the Skyline strip mine of the United Electric Coal Cos. at Evanston, Breathit County, Ky., Monday, April 27, on the Sixth Annual High School Seniors' Day sponsored by the Big Sandy-Elkhorn Coal Mining Institute, with the cooperation of the Mayo State Vocational School and Big Sandy-Elkhorn Coal Operators' Association.

Keynote of the annual event, as noted in the program, is not the intent "of the Institute or other agencies to encourage boys to leave school to enter the coal mining industry. The program is to acquaint the boys with Kentucky's second largest industry; an industry in which all of us in Eastern Kentucky are vitally interested and upon which we are certainly directly or indirectly dependent."

During the day, the boys were shown the modern washing and sizing plant, a 30-yd Bucyrus-Erie Model 950-B electric shovel in operation, a 7-yard special loading shovel digging coal from a 14-ft seam and loading 25-ton tractor trailers which haul at 25 mph, and the firing of an overburden shot containing 25 tons of explosives. A noonday lunch was served by the Big Sandy-Elkhorn Coal Operators' Association. A movie shown covered the complete story of strip mining from prospecting to consumer, including the Kolbe excavating wheel as used in Illinois.

L. M. Barco, general superintendent, United Electrical Coal Cos., was host to the group. M. E. Prunty, safety director, Consolidation Coal Co. (Ky), and president of the institute, and J. H. Mosgrove, secretary and safety director of the institute, participated. Among the other coal men in the group were: David Bayer, manager, Kentucky-Elkhorn Division, Pond Creek Pocahontas Co.; M. M. McCormick, superintendent, Elkhorn No. 3 Mine of Pond Creek Pocahontas; George Evans, Jr., president and general manager, Glo Valley Mining Co.; A. M. Ayres, general superintendent, Russell Fork Coal Co.; and Arthur Bradbury, safety director, Inland Steel Co.

Holmes Awards Cite Safety Achievements

AN ASSISTANT MINE FOREMAN and two coal miners were among the nine recipients of Medals of Honor of the Joseph A. Holmes Safety Association for assuming grave risks in saving lives of fellow workmen, it was announced May 6 by John J. Forbes, director of the USBM and president of the association.

In addition, 527 certificates of Honor to individuals, mines, plants and companies in the Nation's mineral industries were approved by the association at its annual meeting in Washington April 28. Winners were selected from some 900 safety records submitted by operating companies, national associations and individuals. Among the recipients were 94 coal mines and companies and a number of coal mine supervisors and workers. The Allegheny Valley Council of the Holmes Safety Association was awarded a Certificate of Honor for operating without a fatality during 1952. At the meeting, the association also re-elected R. G. Warncke, USBM, secretary.

Luther McAnally, Jr., assistant mine foreman, Concord mine, TC&I Div., U. S. Steel Co., Bessemer, Ala., was awarded a Medal of Honor for knowingly endangering his own life to remove Cleburn R. J. Barnett, an electrical repairman, from contact with a 440-v electrical circuit. Coming on the scene, Mr. McAnally immediately grabbed a rubber lamp cord, looped it around Mr. Barnett's body and pulled him free. In spite of the dangerously close quarters, he then gave the victim artificial respiration and revived him in about 15 min.

Other Medal of Honor winners included Dwight Knupp, miner at Gray No. 3 mine, Acosta-Gray Co., Gray, Pa., and William Boyd Woodward, miner at No. 2 mine, Kaiser Steel Corp., Sunnyside, Utah. Mr. Knupp and a fellow worker, Lawrence Geisbert, both were knocked unconscious in a local gas explosion. On recovering, Mr. Knupp, though injured, dragged himself and his companion, who was unable to crawl, out of the explosion area and onto the conveyor belt and safety. Mr. Woodward was helping to clean up and enlarge an old section of the mine when part of the roof fell and completely covered one of his two companions. Sending the other man for help, Mr. Woodward released the injured man, even though the entire roof section was still crumbling and threatening to fall, removed him to safety, gave him first aid and assisted in getting him to the hospital.

(*Continued on p 178*)

Increase Tonnage—Better Safety with M·S·A Products Featured at the COAL SHOW

EDISON R-4 ELECTRIC CAP LAMP

The brilliant, dependable, unfailing light of the Edison R-4 Lamp gives miners the better light they must have to work today's mechanized equipment at its greatest capacity, safely. We'll be glad to demonstrate its value.

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The practical answer to your dust problems created by rotary or percussion drilling. U. S. Bureau of Mines Approved. Let us show you the facts on this efficient aid to dry drilling for roof-bolting.

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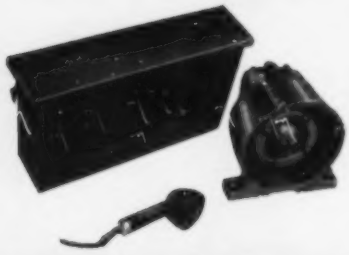

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"Twenty Questions"

Here are the answers to the problems posed in this month's Foremen's Forum (p 118 and 120). How did you do?

1. **0.559**
2. **$75.60**
3. **75 ft.**
4. **0.067 ohm.**
5. **(b) Low-resistance split**
6. **84.3%.**
7. **19,603.6 lb**
8. **23,524.3 lb**
9. **2,361.8 gal**
10. **2,361.8 gal**
11. **706.86 fpm.**
12. **7 to 1.**
13. **150 lb.**
14. **$24.62**
15. **No, they would be 90 mi apart**
16. **6,000 cfm.**
17. **1.414.**
18. **2 cans.**
19. **Yes. They have 8.86 cu yd to remove and they can remove 10 cu yd per 8-hr shift.**
20. **$589.36.**

HOLMES AWARDS . . . Cont'd

Certificates of Honor for outstanding supervisory work went to:

H. C. Hillman, mine foreman, Docena mine, TC&I Div., U. S. Steel Corp., Bessemer, Ala., for having no lost-time accidents to the men on his shift from Nov. 27, 1951, to Dec. 31, 1952, a total of 288,926 man-hours.

G. D. Myrick, mine foreman, Edgewater mine, TC&I Div., U. S. Steel Corp., Birmingham, Ala., for having no lost-time accidents on his shift from Oct. 19, 1951, to Dec. 31, 1952, or 251,496 man-hours.

Luther Stanford, haulage foreman, Dolomite mine, Woodward Iron Co., Pleasant Cove, Ala., for supervising the haulage crew from May 3, 1947 to Jan. 1, 1953, a total of 283,292 man-hours, without a lost-time accident.

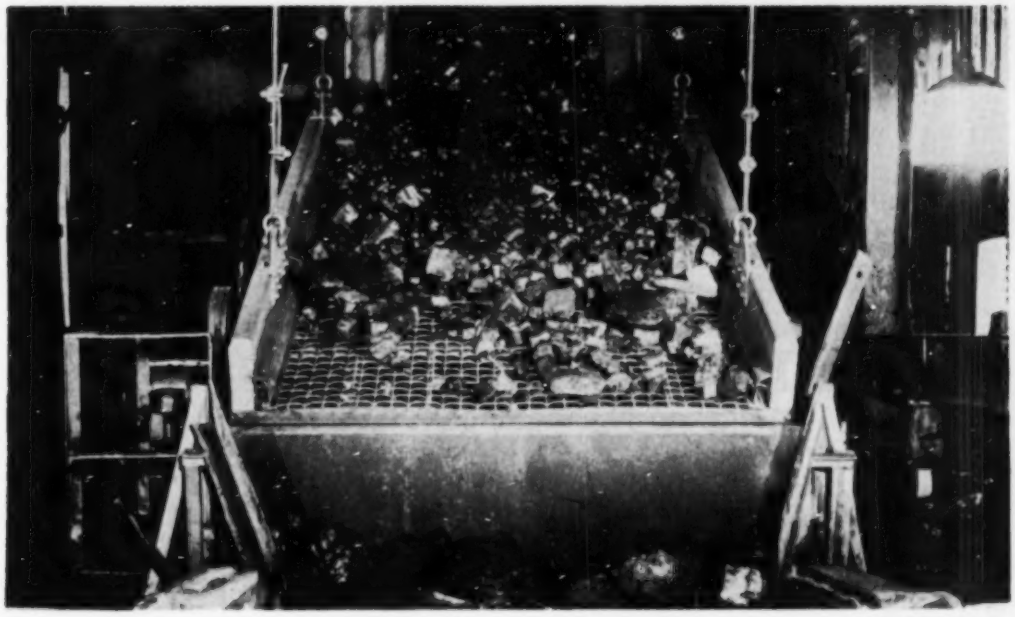
Frank Turner Jr., assistant mine foreman, Docena mine, TC&I Div., U. S. Steel Corp., Docena, Ala., for having no lost-time accidents to the men under his supervision from Dec. 1, 1950, to Dec. 31, 1952, or 324,051 man-hours.

Ira S. Bledsoe, Roda colliery, Stonega Coke & Coal Co., Roda, Va., for supervising an underground transportation crew of 12 men without a lost-time accident from Nov. 7, 1947, to Dec. 31, 1952, and continuing, a total of 124,032 man-hours.

Willie L. Curry, assistant foreman, Pond Creek colliery, Williamson, W. Va., for supervising an underground crew of 12 men without a lost-time accident for 5 yr 7 mo, a total of 100,800 man-hours.

Gyroset VIBRATING SCREENS

Positive Eccentric Action . . .



Sizing . . . Dewatering

The Gyroset Screen has a positive eccentric action giving a full circle throw thruout the length and width of the screen surface. It is of the two-bearing type providing minimum moving parts to give the required eccentric action.

The Gyroset in addition is adjustable readily in the field, without special tools, to any one of eight stroke settings ranging from 0 to 3/8".

All moving parts run in a bath of oil and are sealed against the entrance of foreign matter. The mechanism is outside of the deck structure, the only portion within the line of the flow of the material being the shaft housing which occupies only a limited amount of space.

The Gyroset Screen can effectively scalp or size, due to the adjustable eccentric action, the ability to operate at high speeds and at any degree of pitch or slope. This Gyroset Screen can be readily adjusted as to action to give maximum volume for rough scalping to give the highest possible degree of efficiency in grading and at higher capacity than any other screening unit.

To satisfactorily dewater, a vibrating screen must not only have an action capable of conveying the solids across its length but must have sufficient vertical action to drive the liquid thru the mesh. In other words, sufficient to break the surface tension of the liquid and pass it thru the screening media—in volume.

Gyroset Vibrating Screens have that type of action in their adjustable positive eccentric stroke, giving full circle throw motion to the entire screen area.

Gyroset Screens are available with electrically heated screen cloth for damp sticky operations. Our L&L cleaner is recommended for problems involving near size plugging.

Gyroset Vibrating Screens are made in one to 3 decks and in widths from 18" to 72" with lengths from 4' to 16'.

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COMING MEETINGS

Mine Inspectors' Institute of America: 43rd annual convention, June 8-9, Thomas Jefferson Hotel, Birmingham, Ala. (Secretary, C. A. McDowell, 427 Park Ave., California, Pa.)

West Virginia Coal Mining Institute: Annual spring meeting, June 5-6, Fairmont Hotel, Fairmont, W. Va.

Kanawha Valley Mining Institute: Annual Safety Day, Saturday, June 27, Montgomery, W. Va.

Central Appalachian Section, AIME: Spring meeting, June 13-14, Beecher Hotel, Somerset, Ky.

Rocky Mountain Coal Mining Institute: 49th meeting, June 28-July 1, Colorado Hotel, Glenwood Springs, Colo.

William Feick, assistant mine foreman, Pittsburgh Coal Co., Finleyville, Pa., for supervising an underground crew without a lost-time accident from Sept. 28, 1942, to Jan. 1, 1953, a total of 267,624 man-hours.

Clyde Frabizie, assistant mine foreman, Pittsburgh Coal Co., Blythedale, Pa., for supervising an underground crew of 33 men without a lost-time accident from Sept. 1, 1944, to Jan. 1, 1953.

Seward Funk, mine foreman, Newfield mine, Republic Steel Corp., Oakmont, Pa., for having no accident to the men under his supervision for 1,319 days, from Nov. 2, 1946, to Jan. 1, 1953, and continuing, a total of 307,120 man-hours.

Virgil Gannon, foreman, Pond Creek colliery, Williamson, W. Va., for supervising an underground crew of 35 men without a lost-time accident for 4 yr 1 mo, a total of 264,840 man-hours.

John Gillman, mine foreman, Pond Creek colliery, Williamson, W. Va., for having no lost-time accidents to men under his supervision for 5 yr 7 mo, a total of 440,000 man-hours.

Hays Hylton, assistant foreman, Pond Creek colliery, Williamson, W. Va., for supervising an underground crew of 12 men without a lost-time accident for 6 yr 4 mo, a total of 153,800 man-hours.

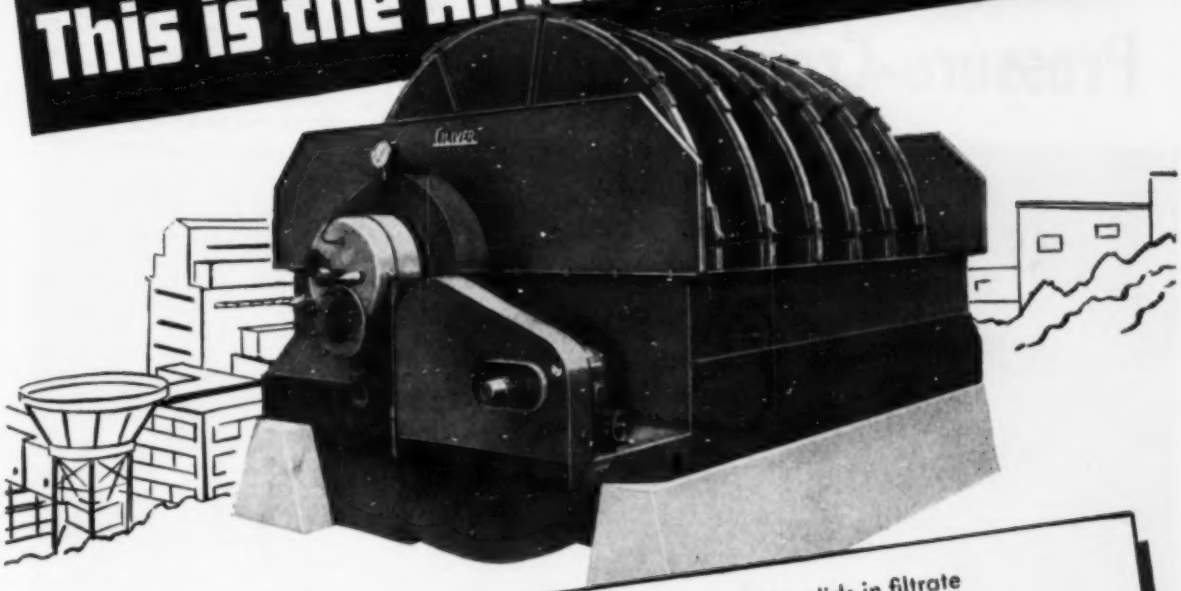
John Kmeta, assistant mine foreman, Pittsburgh Coal Co., Sutersville, Pa., for supervising an underground crew of 30 men without a lost-time accident from Sept. 1, 1947, to Jan. 1, 1953, a total of 271,972 man-hours.

Stanley Kosharsky, assistant mine foreman, Pittsburgh Coal Co., Canonsburg, Pa., for supervising an underground crew of 56 men without a lost-time accident from Mar. 1, 1947, to Jan. 1, 1953, a total of 525,952 man-hours.

O. K. Lovell, assistant foreman, Pond Creek colliery, Williamson, W. Va., for supervising an underground crew of 17 men without a lost-time accident for 5 yr 1 mo, a total of 142,800 man-hours.

Alex B. Martinelli, assistant mine fore-

This is the AMERICAN FILTER



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KOPPERS COMPANY, INC.
Wood Preserving Division
Pittsburgh 19, Pa.

PRESSURE-CREOSOTED WOOD

EQUIPMENT APPROVALS

Thirteen approvals of permissible equipment were issued by the U. S. Bureau of Mines in April, as follows:

Joy Mfg. Co.—Type CD42 coal drilling machine; 26-hp motor, 220 and 440 v, AC; Approvals 2-921 and 2-921A; April 3.

Marietta Mfg. Co.—Marietta continuous coal miner; 25-hp and 70-hp motors, 230 v, DC; Approval 2-922; April 6.

Joy Mfg. Co.—Type 6SC5PF/PXF cable reel shuttle car; three 7½-hp motors, 500 v, DC; Approval 2-923A; April 8.

Acme Machinery Co.— Model 240-6-T air compressor; 50-hp motor, 230 v, DC; Approval 2-924; April 10.

Jeffrey Mfg. Co.—Type MT—68 cable reel shuttle car; three 7½-hp motors, 250 v, DC; Approval 2-925; April 10.

Joy Mfg. Co.—Type PP6-1PE post-puller; two 7½-hp motors, 250 v, DC; Approval 2-926; April 14.

Goodman Mfg. Co.—Type L-14 shaker conveyor; 15-hp motor, 230 v, DC; Approval April 20.

Jeffrey Mfg. Co.—Type MT-67 cable reel shuttle car; three 10- or 15-hp motors, 250 v, DC; Approval 2-928; April 21.

Joy Mfg. Co.—Type 10SC2PE/PXE cable reel shuttle car; two 5-hp and three 10-hp motors, 250 v, DC; Approval 2-929; April 24.

Goodman Mfg. Co.—Type 583-42 cable reel shuttle car; four 10-hp motors, 250 v, DC; Approval 2-930; April 29.

Jamison Coal & Coke Co.—drilling machine; 5-hp motor, 250 v, DC; Approval 2-931; April 29.

Joy Mfg. Co.—Type U-742-10AG/AH shaker conveyor drive; 15-hp motor, 220 and 440 v, AC; Approvals 2-932 and 2-932A; April 30.

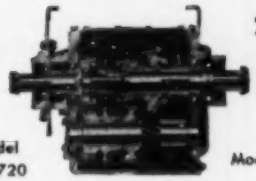
Joy Mfg. Co.—Type U-179-25BE/F 15CC chain conveyor drive unit; 4-hp motor, 250 and 500 v, DC; Approvals 2-933 and 2-933A; April 30.

man, Banning mine, Republic Steel Corp., Smithton, Pa., for supervising an underground crew without an accident for 1,187 days, from Apr. 23, 1947, to Jan. 1, 1953, and continuing, a total of 337,928 man-hours.

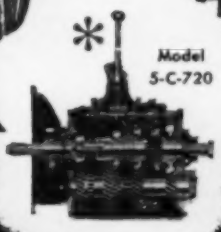
Paul Mayerchak Sr., mine foreman, Pond Creek colliery, Williamson, W. Va., for supervising an underground crew of 30 men without a lost-time accident for 5 yr 1 mo, a total of 252,000 man-hours.

Elbert Maynard Jr., assistant foreman, Pond Creek colliery, Turkey Creek, Ky., for supervising an underground crew of 12 men without a lost-time accident for 5 yr 7 mo, a total of 126,000 man-hours.

Walter T. Maynard, assistant foreman,



Model 3-A-65



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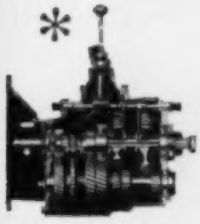
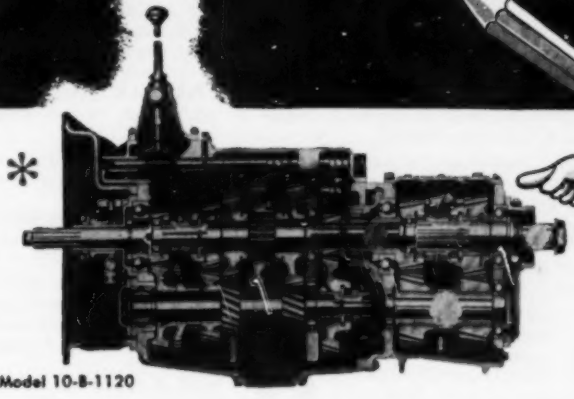


Model 5-A-620



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Among the more than 110 Fuller Transmission models for every heavy-duty job—there is a "proved in service" unit to fit *your* job . . . designed to operate quietly and dependably . . . profitably . . . and built to stand up under the most grueling conditions, on or off the highway.

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REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

Pond Creek colliery, Turkey Creek, Ky., for supervising an underground crew of 18 men without a lost-time accident for 5 yr 4 mo, a total of 151,200 man-hours.

George McClafferty, tipple foreman, Russellton mine, Republic Steel Corp., Indianola, Pa., for supervising a tipple crew of 19 men for 2,138 days without a lost-time accident, from Sept. 1, 1943, to Jan. 1, 1953, and continuing, a total of 388,845 man-hours.

A. E. McClellan, general foreman, Pond Creek colliery, Williamson, W. Va., for supervising a crew of 35 men without a lost-time accident for 7 yr 4 mo, a total of 411,600 man-hours.

Loyd F. Minor, Stonega Coke & Coal Co., Big Stone Gap, Va., for working in and around the Imboden colliery for 44 yr, advancing from laborer to superintendent, without a lost-time accident.

Ralph O'Brien, cleaning plant foreman, Banning mine, Republic Steel Corp., Smithton, Pa., for supervising 66 employees operating a cleaning plant for 1,224 days without a lost-time accident from Feb. 10, 1947, to Jan. 1, 1953, and continuing, a total of 606,507 man-hours.

William A. Pack, mine foreman, Inland Steel Co., Wheelwright, Ky., for supervising an underground crew of 17 men for over 8 yr, 1944-1953, a total of 227,160 man-hours without a lost-time accident.

Fred Reach, tipple foreman, Roda colliery, Stonega Coke & Coal Co., Roda, Va., for supervising a tipple crew of 25 men without a lost-time accident from Oct. 9, 1942, to Dec. 31, 1952, and continuing, a total of 473,200 man-hours.

John Shaynak, assistant mine foreman, Crescent No. 2 mine, Republic Steel Corp., Charleroi, Pa., for supervising an underground crew without an accident for 2,260 days, from Feb. 28, 1943, to Jan. 1, 1953, and continuing, a total of 273,770 man-hours.

Ted Simpkins, assistant mine foreman, Republic mine, Republic Steel Corp., Elkhorn, Ky., for supervising an underground crew for 1,953 days without a lost-time accident, from Mar. 19, 1944, to Jan. 1, 1953, and continuing, a total of 395,057 man-hours.

William Smith, assistant mine foreman, Crescent No. 2 mine, Republic Steel Corp., Charleroi, Pa., for supervising an underground crew without an accident for 1,492 days, from Dec. 5, 1945, to Jan. 1, 1953, and continuing, a total of 263,343 man-hours.

Clyde Stamper, section foreman, Derby colliery, Stonega Coke & Coal Co., Big Stone Gap, Va., for supervising an underground crew of 33 men without a lost-time accident from June 6, 1947, to Oct. 6, 1952, a total of 292,248 man-hours.

Leon H. Strecker, outside foreman, Philadelphia & Reading Coal & Iron Co., Mt. Carmel, Pa., for supervising the surface employees of the Alaska colliery from July 14, 1948, to Oct. 3, 1952, a total of 458,588 man-hours without a lost-time accident.

Fred Wardle, outside foreman, Pittsburgh Coal Co., Venetia, Pa., for supervising an outside crew of 32 men with-

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1 IT IS LIGHT. Two 50-foot coils of Triangle Flexible Pipe are so light they can easily be carried by one man.

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The DorrClone now equipped with Type CB Liner of Proven* Wear-Resistant Characteristics for Coal

The DorrClone . . . compact, high-efficiency deslimer . . . is now available with the special Type CB liner which solves the serious wear problem encountered in coal washing plant applications. This is but one result of a continuing Dorr program aimed at developing the best design and materials of construction for each DorrClone application.

Just how good is this liner? We'd suggest that you check for yourself. The results of its initial test at the Robena Mine are shown below.

Now . . . you can take full advantage of the remarkable economy and operating efficiencies of the DorrClone without concern over the wear factor. You can use it to recover your valuable fine coal fractions between 8 and 325 mesh at high density in a single stage. It will eliminate your high ash content slimes. And . . . as a Classifier ahead of a Dorr Thickener, it will help give you a completely closed water circuit.

For all the details, call for a Dorr engineer. He will gladly show you where it can be used in your flowsheet.

***Here are the facts . . .**

LOCATION: Robena Mine of United States Steel Corporation's Coal Division.

EQUIPMENT: 6" dia. DorrClone equipped with Type CB liner.

DURATION OF TEST: A total of 896 operating hours between February 3 and April 15, 1953, when the unit was taken off the line for exhibit at the Coal Show in Cleveland.

FEED TO DORRCLONE: Overflow from hydraulic classifier

Rate:	100 gpm
Screen Analysis:	20% + 35 mesh 60% —325 mesh
Percent solids:	21
Percent ash:	17
Feed Inlet Pressure	40 psi (average)

WEAR RESULTS:

Wear in conical section: *negligible*
Wear at apex valve: *negligible*

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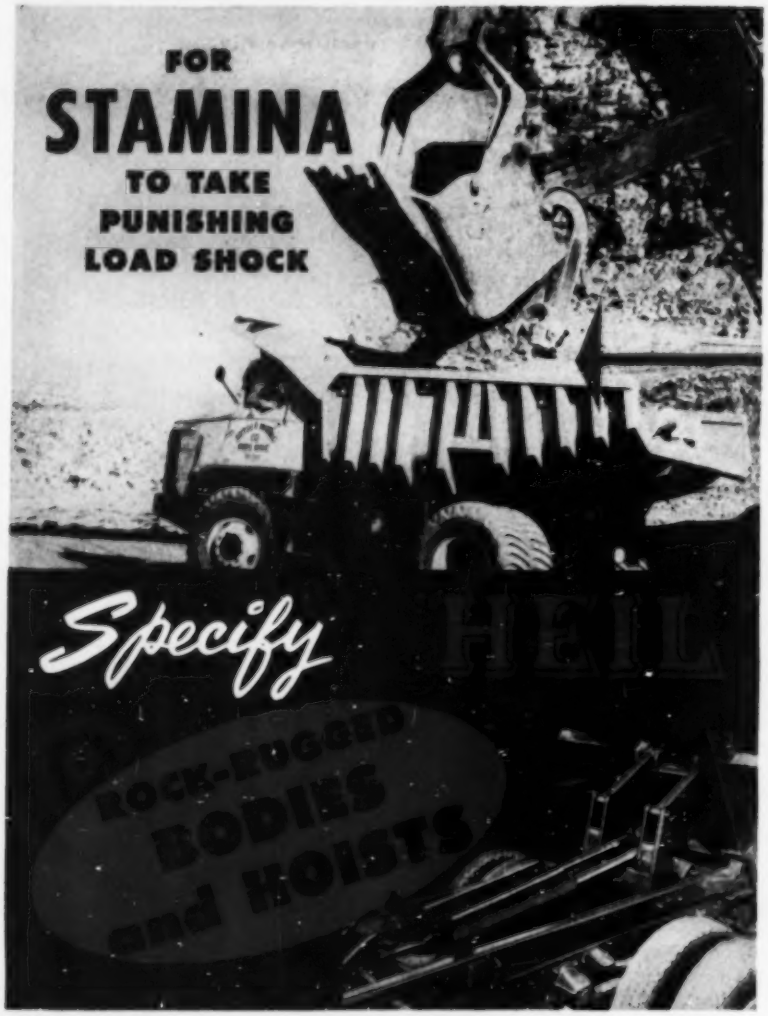

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BH-10

HEILINER 13 AND 18-CU. YD. SCRAPERS

HEILINER 20-CU. YD. BOTTOM DUMP WAGON

CONTRACTOR'S BODY

out a lost-time accident from June 8, 1944, to Jan. 1, 1953, a total of 486,400 man-hours.

B. H. Waugh, outside foreman, Pittsburgh Coal Co., Eighty-Four, Pa., for having no lost-time accidents to men under his supervision from May 7, 1941, to Jan. 1, 1953, a total of 392,408 man-hours for an average of 31 employees.

James B. White, assistant foreman, Pond Creek colliery, Williamson, W. Va., for supervising an underground crew of 17 men without a lost-time accident for 5 yr 1 mo, a total of 159,600 man-hours.

John A. Zsoldos, ventilation foreman, Pond Creek colliery, Williamson, W. Va., for supervising a ventilation crew of 9 men without a lost-time accident for 7 yr 8 mo, a total of 105,840 man-hours.

Clarence Bennett, tipple foreman, Pardee & Curtin Lumber Co., Bergoo, W. Va., for supervising the crew of a tipple for 18 yr, 341,350 man-hours for 3 employees without a lost-time accident.

Joe V. Moncho, general foreman, Pond Creek colliery, Williamson, W. Va., for having no lost-time accidents to the men under his supervision for 12 yr, a total of 348,480 man-hours.

Certificates of Honor for exceptional safety records were awarded the following coal mines and mining companies:

Colorado Fuel & Iron Corp. and the following mines: Crested Butte, Kebler, Rockvale No. 3, Frederick, and Morley mines.

Columbia-Geneva Steel Div., U. S. Steel Corp.: Columbia and Geneva mines.

St. Louis, Rock Mountain & Pacific Co.: Koehler mine.

The Union Pacific Coal Co.: Reliance No. 1 mine, No. 11 seam, Reliance No. 7 mine, Stansbury No. 3 mine, Stansbury mine, No. 7½ seam, and Winton No. 7½ mine.

Alabama By-Products Corp.: Barney, Bradford, Colta and Labuco mines.

Tennessee Coal & Iron Div., U. S. Steel Co.: Concord, Docena, Edgewater, Hamilton and Short Creek coal mines.

Tennessee Products & Chemical Corp.: Reels Cove No. 2 mine.

Woodward Iron Co.: Mulga mine.

Amherst Coal Co.: Amherst 1A, 1C, 3A and MacGregor No. 2 mines.

Armco Steel Corp.: Dorothy, Hernshaw, and Nellis mines.

Bethlehem Mines Corp.: Nos. 44, 53, and 101 mines.

Blue Diamond Coal Co.: Leatherwood mine.

Bowman Coal Co.: Bowman No. 2 mine.

Brule Smokeless Coal Co.: Nos. 2 and 3 mines.

Butler Junction Coal Co.: Butler Junction mine.

Consolidation Coal Co. (W. Va.), Div. of Pittsburgh Consolidation Coal Co.: Mines Nos. 32 and 63.

Duquesne Light Co.: Harwick and Warwick mines.

Eastern Gas & Fuel Associates: Kopperston No. 2, Stotesbury Nos. 8 and 11 mines.

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Hendrick Perforated Metal Plate assures a long life of service on vibrating and shaking screens. Available in any desired shape or size of perforations, it can also be supplied flat or corrugated in proper gauges of regular, high carbon, and high tensile steels and in other commercially rolled metals.

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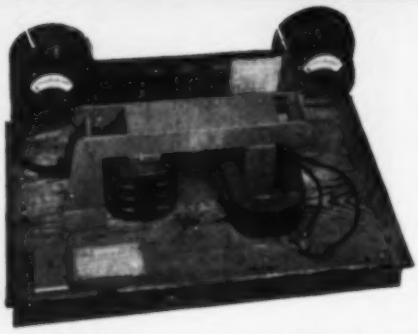

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Quickly and positively locates faults in field and armature coils

Simple to operate, the Flood City Field Coil Testing Machine provides a quick means of locating faults in field and armature coils. With series coil under test even a single short circuited turn instantly registers on the ammeter. Shunt fields are tested by measuring the induced voltage as compared with that of a standard coil.

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Hanna Coal Co.: Georgetown No. 12 and Piney Fork No. 1 mines.

Inland Steel Co.: Wheelwright mine.

Inland Creek Coal Co.: Nos. 1, 7, 20, 22, 24, 25, and 28 mines.

Jones & Laughlin Steel Corp.: Shannopin mine.

Kentucky Cardinal Coal Corp.

Lehigh Navigation Coal Co.: Coaldale colliery.

Mid-Continent Coal Co.: Green Diamond mine.

Pennsylvania Coal Co.: Ewen colliery.

Philadelphia & Reading Coal & Iron Co.: Locust Summit breaker, Maple Hill colliery, Newkirk, and Oak Hill mines, and Shen-Penn Production Co.

Pittsburgh Coal Co., Div. of Pittsburgh Consolidation Coal Co.: Mongah, Montour Nos. 4 and 10, Renton No. 3, and Westland mines.

Pond Creek Colliery: outside force and Thacker mine.

Pond Creek Pocahontas Co.: Nos. 1 and 3 mines.

Princess Elkhorn Coal Co.: Nos. 1 and 2 mines.

Red Jacket Coal Corp.: company supervising officials and Coal Mountain No. 12 and Junior mines.

Republic Steel Corp.: Crescent No. 2, Indianola, and Newfield mines.

Snap Creek Coal Co.: Snap Creek No. 2 mine.

South East Coal Co.: Seco No. 1 mine.

Stonega Coke & Coal Co.: Glenbrook High Splint No. 1, Imboden, and Roda collieries, and Roda No. 5 mine.

West Virginia Coal & Coke Co.: Micco No. 3, Norton No. 2, Omar Nos. 4 and 15 mines.

Columbia-Southern Chemical Corp.: Midvale mine.

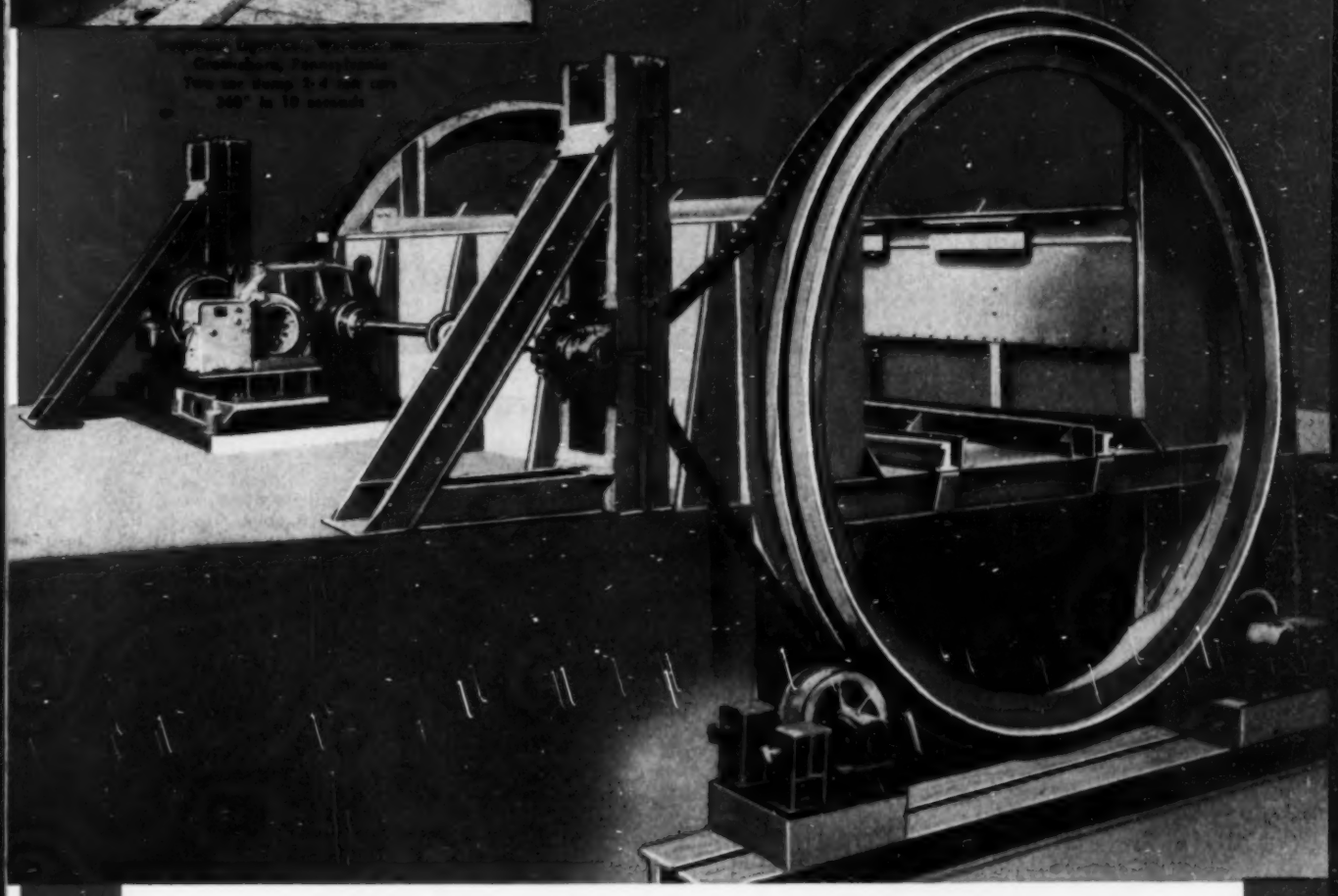
Certificates of Honor were awarded to the following individuals for unusual records of working in or around coal mines without suffering a lost-time accident for the periods noted:

H. A. Havron, TC&I Div., U. S. Steel Co., Birmingham, Ala., 44 yr; Willie Hays, TC&I Div., U. S. Steel Co., Pratt City, Ala., 41 yr; Albert H. Johnson, TC&I Div., U. S. Steel Co., Birmingham, Ala., 41 yr; Charles H. Jones, TC&I Div., U. S. Steel Corp., Wylam, Ala., 42 yr; Ira B. Tidwell, TC&I Div., U. S. Steel Corp., Fairfield, Ala., 48 yr.

Steve Ason, Pittsburgh Coal Co., Sutersville, Pa., 48 yr; John Bachrik, Pittsburgh Coal Co., West Newton, Pa., 42 yr; Joseph Bachrik, Pittsburgh Coal Co., Smithdale, Pa., 43 yr; Elijah Bailey, Pittsburgh Coal Co., Smithton, Pa., 44 yr; Settino Bartolina, Pittsburgh Coal Co., New Eagle, Pa., 45 yr; John Bernosky, Bethlehem Mines Corp., Revloc, Pa., 48 yr; George Blicks, Pittsburgh Coal Co., Lawrence, Pa., 45 yr; Isaac Bowen, Pittsburgh Coal Co., Elizabeth, Pa., 45 yr; Calvin Brown, West Virginia Coal & Coke Corp., Logan, W. Va., 40 yr.

John Buckto, Pittsburgh Coal Co., Monongahela, Pa., 40 yr; Roy Bullock, Pittsburgh Coal Co., Gastonville, Pa., 40 yr; Roddie Bush, Pittsburgh Coal Co., Pricedale, Pa., 48 yr; Peter Capanna,

CHAIN DRIVEN Rotary Car Dumpers SINCE 1938



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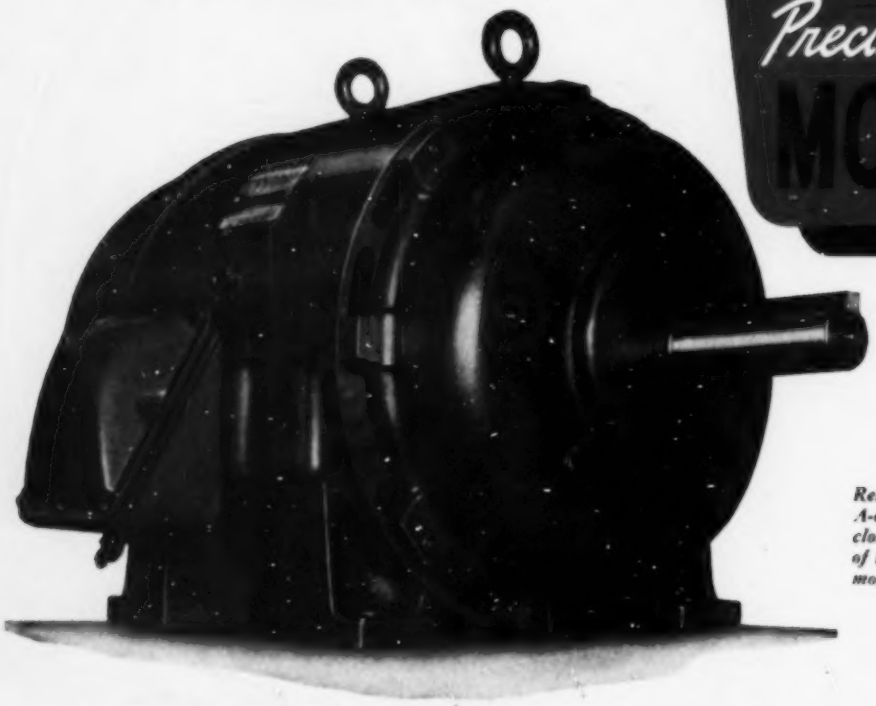

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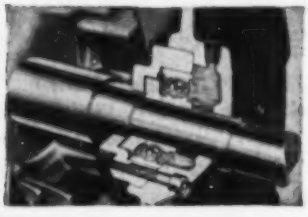

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Robert Finley, Inland Steel Co., Wheelwright, Ky., 45 yr; Thomas Foster, Edwight, W. Va., 57 yr; W. H. Gammon, West Virginia Coal & Coke Corp., Stirrat, W. Va., 40 yr; Ralph Gavazzi, Pittsburgh Coal Co., Belle Vernon, Pa., 45 yr; John F. Gibson, Pittsburgh Coal Co., Elizabeth, Pa., 47 yr; William Gregory, Pittsburgh Coal Co., West Newton, Pa., 42 yr; Thomas F. Hamm, Keystone, W. Va., 45 yr; Robert T. Harler, Keystone, W. Va., 45 yr; Ben Heaverly, Pittsburgh Coal Co., Irvin, Pa., 49 yr; William Hodgson, Punxsutawney, Pa., 51 yr.

George Holgash, Beaverdale, Pa., 45 yr; Charles Hudacek, Beaverdale, Pa., 41 yr; Joseph Hudock, Pittsburgh Coal Co., Monongahela, Pa., 42 yr; William Huey, Jones & Laughlin Steel Corp., Bobtown, Pa., 40 yr; John Jamison, Beaverdale, Pa., 49 yr; I. H. Jenkins, EG&FA, Eccles, W. Va., 42 yr; Charles Kasich, Pittsburgh Coal Co., West Newton, Pa., 42 yr; John Kearns, Pittsburgh Coal Co., Oakdale, Pa., 41 yr; Emanuel Kendricks, Keystone, W. Va., 57 yr; John Knight, Pittsburgh Coal Co., Sutersville, Pa., 49 yr.

B. H. Knox, West Virginia Coal & Coke Corp., Rossmore, W. Va., 49 yr; Stanley Koslasky, Pittsburgh Coal Co., Fayette City, Pa., 41 yr; John Krempasky, Pittsburgh Coal Co., Belle Vernon, Pa., 41 yr; John Kurtito, Pittsburgh Coal Co., Finleyville, Pa., 40 yr; Gus Landini, Pittsburgh Coal Co., Sutersville, Pa., 46 yr; John O. Larson, Barnes & Tucker Co., Bakerton, Pa., 44 yr; Robert K. Lewis, Omar, W. Va., 52 yr; Joseph Linden, Oakdale, Pa., 71 yr.

Steve Mandus, Pittsburgh Coal Co., Strabane, Pa., 46 yr; Charles Marchinick, Pittsburgh Coal Co., Belle Vernon, Pa., 46 yr; Steve Martinko, Beaverdale, Pa., 42 yr; Samuel McBurnie, Pittsburgh Coal Co.; Charleroi, Pa., 44 yr; Robert McCaugh, Pittsburgh Coal Co., Buena Vista, Pa., 48 yr; Joe McCluskey, EG&FA, Beckley, W. Va., 43 yr; J. F. McQuade Sr., EG&FA, Stotesbury, W. Va., 43 yr.

Alfred Menozzi, Pittsburgh Coal Co., Blythedale, Pa., 46 yr; Noah Mullins, West Virginia Coal & Coke Corp., Omar, W. Va., 47 yr; William P. Murphy, EG&FA, Helen, W. Va., 46 yr; Paris Nelson, West Virginia Coal & Coke Corp., Omar, W. Va., 48 yr; James Nicholson, Clearfield, Pa., 50 yr; Steve Novasell, Pittsburgh Coal Co., Fayette City, Pa., 41 yr.

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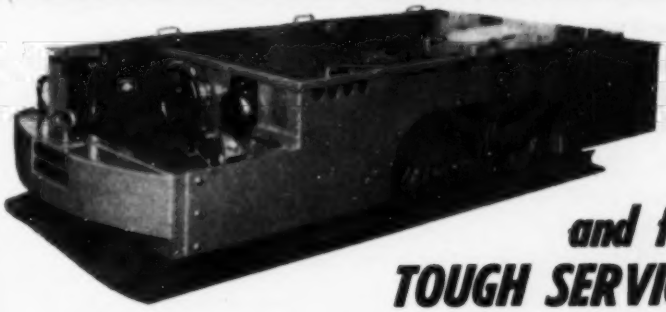

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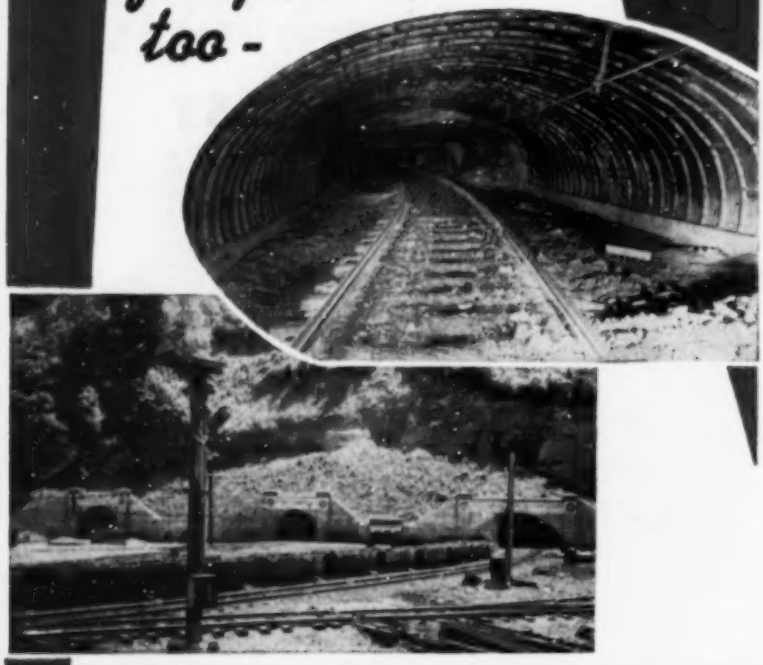

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David Prentice, EG&FA, Keystone, W. Va., 50 yr; Tom Prentice, EG&FA, Keystone, W. Va., 60 yr; Scales Reed, Pocahontas Fuel Co., North Fork, W. Va., 50 yr; Sam Rice, Pittsburgh Coal Co., Belle Vernon, Pa., 43 yr; Steve Rice, Pittsburgh Coal Co., Mt. Lebanon Township, Pa., 47 yr; Frank Richardson, Beaverdale, Pa., 45 yr; Mike Rosinski, Pittsburgh Coal Co., Smock, Pa., 40 yr; Harry Roush, Bethlehem Mines Corp., Ebensburg, Pa., 43 yr.

James Russell, West Virginia Coal & Coke Corp., Omar, W. Va., 50 yr; Tony Samoes, Pittsburgh Coal Co., Charleroi, Pa., 40 yr; Harry Sathman, Pittsburgh Coal Co., Pricedale, Pa., 40 yr; Charles Sawtelle, Barnes & Tucker Co., Spangler, Pa., 51 yr; Frank Sebetch, Pittsburgh Coal Co., Fayette City, Pa., 49 yr; Emil Servant, Pittsburgh Coal Co., Houston, Pa., 47 yr.

Robert Shank, Pittsburgh Coal Co., Elizabeth, Pa., 48 yr; Mike Shewak, Pittsburgh Coal Co., Blythedale, Pa., 42 yr; Louis Simmons, West Virginia Coal & Coke Corp., Omar, W. Va., 59 yr; W. T. Slaughter, Stonega Coke & Coal Co., Stonega, Va., 54 yr; William Issas Slaughter, Stonega Coke & Coal Co., Stonega, Va., 54 yr; Clarence Slowaitis, Pittsburgh Coal Co., Finleyville, Pa., 47 yr; Thomas Smith, Pittsburgh Coal Co., West Newton, Pa., 47 yr.

John Spisak, Pittsburgh Coal Co., Sutersville, Pa., 41 yr; S. D. Stone, Lillybrook Coal Co., Affinity, W. Va., 46 yr; Charles Svoboda, Jones & Laughlin Steel Corp., Bobtown, Pa., 45 yr; Frank Sweltz, Lloydell, Pa., 43 yr; Carlo Tagliavini, Pittsburgh Coal Co., Blythedale, Pa., 45 yr; Guy D. Thompson, EG&FA, Helen, W. Va., 51 yr; John Thorne, Pittsburgh Coal Co., West Newton, Pa., 43 yr.

John Turko, Pittsburgh Coal Co., Finleyville, Pa., 44 yr; Walter Ulbrich, Pittsburgh Coal Co., Sutersville, Pa., 44 yr; Dunmore Vales, Pittsburgh Coal Co., Pricedale, Pa., 44 yr; Mike Vascura, Pittsburgh Coal Co., West Newton, Pa., 42 yr; John Volanski, Pittsburgh Coal Co., Gallatin, Pa., 45 yr; Lester Wagner, Barnesboro, Pa., 40 yr.

Thomas Weightman, Pittsburgh Coal Co., Pricedale, Pa., 40 yr; Dave Wellman Sr., Hensley, W. Va., 49 yr; Lawrence White, Lillybrook Coal Co., Lillybrook, W. Va., 47 yr; Ellis Williams, Pittsburgh Coal Co., Clairton, Pa., 40 yr; Oliver Williams, Pardee & Curtin Lumber Co., Webster Springs, W. Va., 53 yr; John Wozniak, Pittsburgh Coal Co., Fayette City, Pa., 47 yr; Joseph Yanovich, Pittsburgh Coal Co., Coal Center, Pa., 47 yr; Tony Ziggler, Pittsburgh Coal Co., Woodville, Pa., 44 yr; Joseph Macine, Jones & Laughlin Steel Corp., California, Pa., 46 yr; George Stulanseck, Jones & Laughlin Steel Corp., Vestaburg, Pa., 47 yr; Lee M. Blackwell, Twin Branch-Black Eagle

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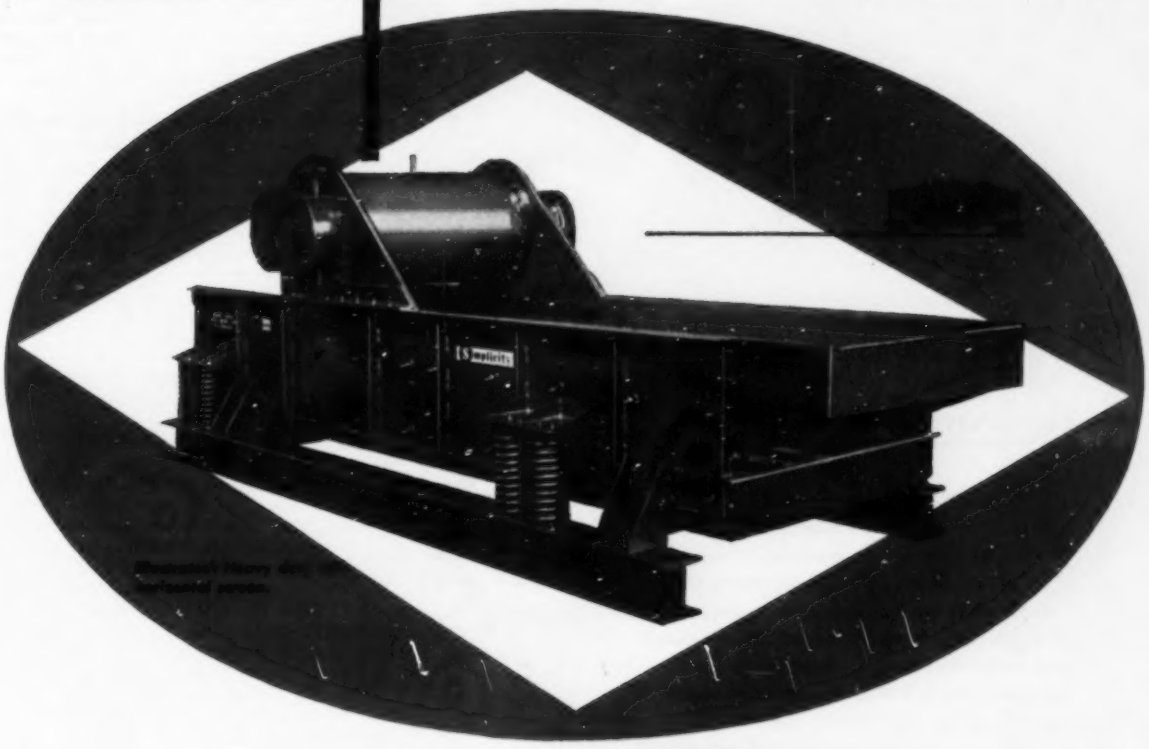
do a fast, efficient job of sizing, separating, dewatering and dedusting coal for the mining industry



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Safety Group Plans June Meet

The Fred J. Bailey Post No. 4, National Mine Rescue Association of Benton, Ill., has planned a discussion meeting June 19, and encourages mine-rescue men from Illinois, Indiana, western Kentucky, Iowa and Missouri to attend and join the group. For further information, contact Coy L. South, secretary-treasurer, 122 McCann Street, Benton, Ill.

New Books for Coal Men

Better Use for Low-Grade Coals

Drying and Carbonization of Fine Coal in the Entrained and Fluidized State, by V. F. Parry, W. S. Landers, E. O. Wagner, J. B. Goodman and G. C. Lammers. USBM, R. I. 4954. Here's the process, based on experiments and studies by the Bureau of Mines, by which Texas Power & Light Co. will prepare and burn lignite to make power for the new smelting plant of Aluminum Co. of America, in Milam County, Tex. Costs are expected to be competitive with natural gas in the area. Recovery of chemicals is significant in the process. *8x10½-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13.*

1952 Book of ASTM Standards. This periodic updating and revision of an industrial standby comes this year in seven parts: (1) Ferrous Metals, (2) Non-Ferrous Metals, (3) Cement, Concrete, Ceramics, Thermal Insulation, etc., (4) Paint, Naval Stores, Wood, Fire Tests, Building Constructions, (5) Fuels, Aromatic Hydrocarbons and Engine Antifreezes, (6) Rubber, Plastics and Electrical Insulation, and (7) Textiles, Water, Adhesives, etc. Each part has its own index and table of contents. Standards, tests, specifications and definitions total over 2,000. *Total pages, 9,975. Parts 1, 3 and 6, $12 each; Parts 2, 4, 5 and 7, $10 each; complete set, $76. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.*

Better Air—More Safety

Modified Plan of Panel Mine Development Designed to Eliminate Hazards Due to Inadequate Ventilation in Mines of the Central Coal Basin, by C. A. Herbert. USBM, I. C. 7656. This survey of 22 mines in Illinois, Indiana and West Kentucky concludes that poor ventilation, permitting dangerous quantities of explo-

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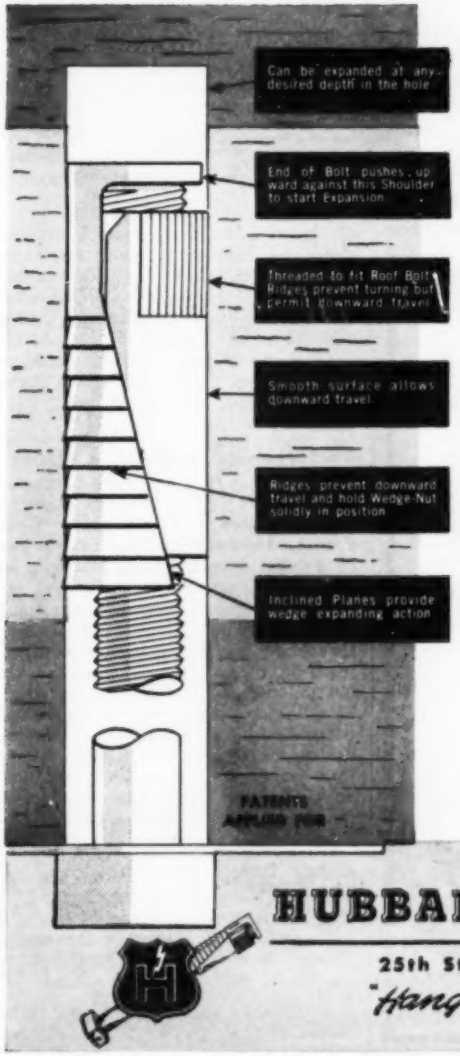
Can be expanded at any desired depth in the hole
End of Bolt pushes upward against this Shoulder to start Expansion
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Smooth surface allows downward travel
Ridges prevent downward travel and hold Wedge-Nut solidly in position
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PATENTS APPLIED FOR

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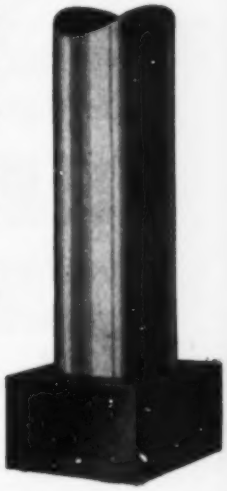
- If holes are not perfectly straight, the Hubbard Bolt will enter where many others will not; no installing tool clearance is required.
- The Hubbard Roof Bolt is the simplest in design, is easily and quickly installed without special tools.



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COAL MEN ON THE JOB . . .

Reels Cove Officials Complete Training Course

THESE SUPERVISORS at the Reels Cove mine, Tennessee Products & Chemical Corp., Whitwell, Tenn., recently received a 100% attendance certificate for the USBM Accident-Prevention Course conducted by Joseph Neal, USBM instructor, Jellico, Tenn. Shown at the closing dinner presented by Carl McFarlin Sr., company president, are: Front row—Max Condro (left); Joseph Neal; Charles H. Dodge, chief of Jellico office, USBM; W. F. Travis, manager of mines; Herschel Daffron, superintendent, Reels Cove mine; Edgar Hixon; Robert Reeves, general mine foreman; Hugh Barker, chief electrician; Frank Holtcamp; H. C. Humphreys, principal, Whitwell High School. Back row—W. E. Turner (left); E. A. Baird, superintendent, Marion County schools; Dan Steele; W. D. Eakins; Harold G. Condro; Archie Reeves; Clint Kolgore; Chester Brown; James Saynes; Arlie White; Ralph Rankin, and Howard Hixon.

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sive gas to accumulate, causes most mine explosions. The study reveals that more than half of the air delivered by fans may be lost before reaching the working faces, especially in room-and-pillar panel mining. The Bureau suggests methods for curbing the danger. *15 pp. 8x10½-in; paper; mimeo. Free, Publications Distribution section, 4800 Forbes St., Pittsburgh 13, Pa.*

Bacteria and Acid Mine Water

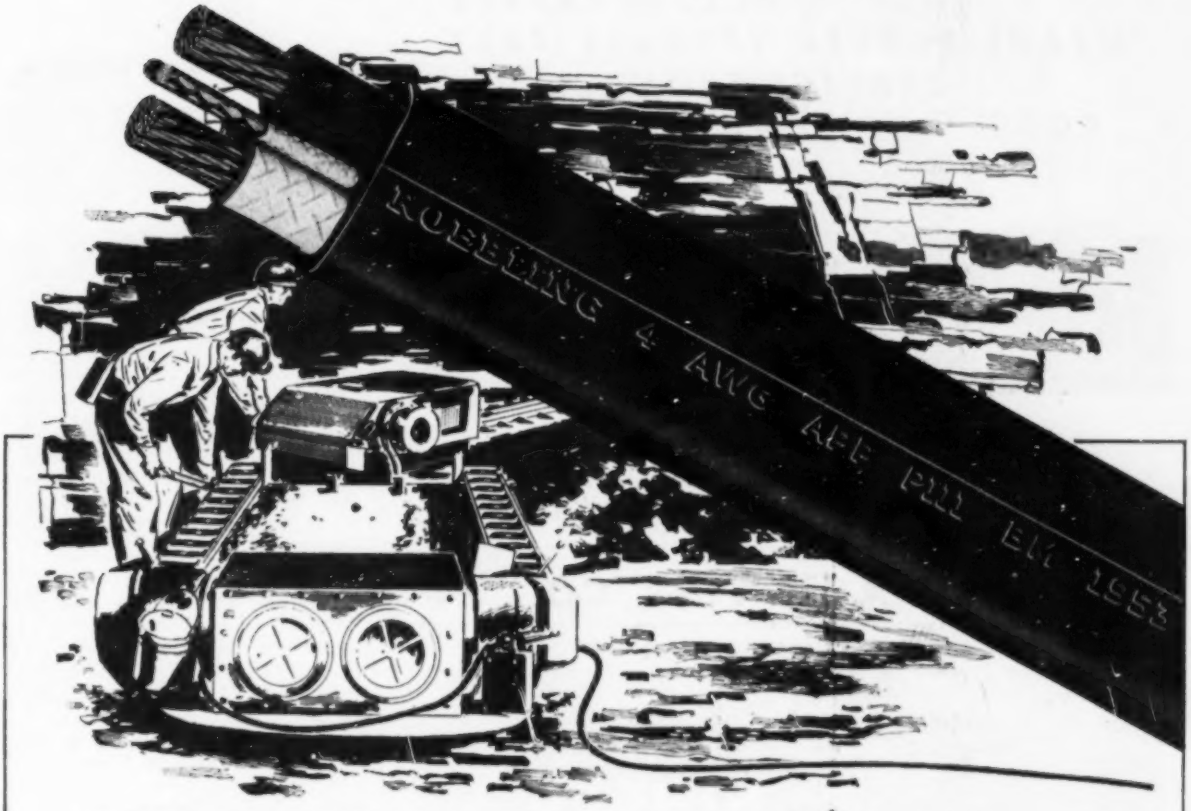
The Role of Bacteria in the Formation of Acid From Certain Sulfuritic Constituents Associated With Bituminous Coal: Part I, Thiobacillus Thiooxidans; Part II, Ferrous Iron Oxidizing Bacteria, by W. W. Leathen, S. A. Braley Sr. and L. D. McIntyre. Part I demonstrates that Thiobacillus Thiooxidans increases the acidity and the quantity of sulfate when in contact with elemental sulfur but produces no acid from sulfur balls. Part II shows that some still unclassified bacteria in bituminous-mine effluents oxidize ferrous iron in acid solutions and form sulfate from sulfur balls but have no effect on pyrite. *8 pp. 8¼ x 11¼-in; unbound. Free, Mellon Institute, 4400 Fifth Ave., Pittsburgh 13, Pa.*

Other Books and Booklets

The following publications by the U. S. Bureau of Mines may be obtained free upon request to Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. All are 8x10½-in; paper; mimeo.

Washability Study of the Upper Hartshorne Bed at Quality Mine, Hackett,

WHY ROEBLING MINING MACHINE CABLES GIVE MORE FOR YOUR MONEY



ANY WAY you look at it, Roebling Roeprene Mining Machine Cables are today's best buy. The ground wire in these cables is made of flat, braided copper so that they have *extra* stretch and flexibility. Then, the neutral is covered with braided cotton which cushions and greatly reduces abrasive action between the copper and the insulation.

And to make sure that all components of the cables are held firmly in place, Roebling employs an additional process and "lead-mold" cures the Roeprene jackets. This curing method also produces a very tough, long-wearing jacket with outstanding resistance to water, acids, alkalis and grease.

Roebling Roeprene Mining Machine Cables are approved by the Pennsylvania Bureau of Mines Approval P-111, and comply with the requirements of the U. S. Bureau of Mines for flame-resistance. They are continuously mold marked for positive identification.

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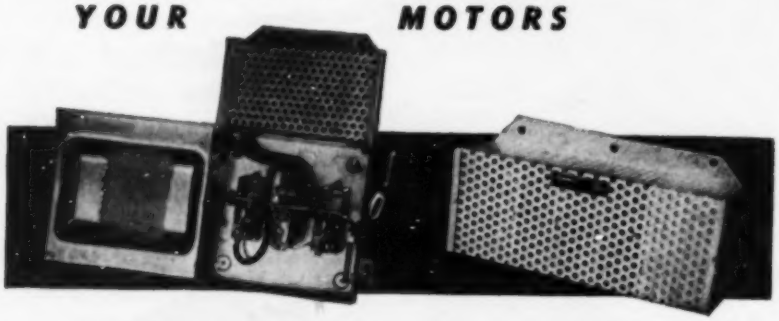
SMOOTH STARTS with GUYAN

D. C. STARTERS MEANS LONGER TROUBLE-FREE SERVICE FROM YOUR MOTORS

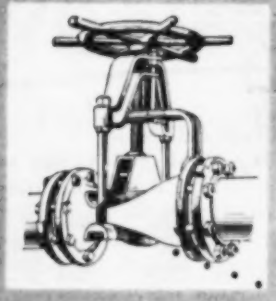


GUYAN TYPE MMS MOTOR STARTER
Manually operated — automatically makes armature-to-line connection at proper speed to insure smooth starts after power disruptions. Solderless lug connections.

GUYAN TYPE CMS MOTOR STARTER
Limits initial inrush of current—permits smooth starts—prevents arcing. Requires no operator. Similar to type MMS except for omission of manually operated starting switch.

Write for bulletins

GUYAN MACHINERY CO. LOGAN, W. VA.



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WRITE FOR FREE BULLETIN

Ark., by B. W. Gandrud and H. L. Riley. R. I. 4964.

Determination of Moisture-Holding Capacity (Bed Moisture) of Coal for Classification by Rank, by W. A. Selvig and W. H. Ode. R. I. 4968.

Convertol Process of Coal-Slurry Treatment, by Thomas Fraser. I. C. 7660.

Preparation Facilities

Kentucky Fuel Co., Hellier, Ky.—Shipment by Deister Concentrator Co. of three SuperDuty Diagonal-Deck No. 7 coal-washing tables, cleaning ⅛x0 coal, and one Concenco Model 109 revolving feed distributor to feed the tables.

Bell & Zoller Coal & Mining Co., Johnson City, Ill.—Shipment by Deister Concentrator Co. of one SuperDuty Diagonal-Deck No. 7 coal-washing table.

Stoudt's Ferry Preparation, Leesport, Pa.—Shipment by Deister Concentrator Co. of two SuperDuty Diagonal-Deck No. 7 coal-washing tables, one for pea coal and the other for No. 2 buck anthracite.

United States Steel Corp., Robena slope mine, Greensboro, Pa.—Shipment by Deister Concentrator Co. of three Concenco Model 108-B-1 revolving feed distributors.

Rochester & Pittsburgh Coal Co., O'Donnell mine, Four States, W. Va.—Shipment by Deister Concentrator Co. of two Leahy heavy-duty vibrating screens equipped with FlexElex heated screen cloth.

Crucible Steel Co., Crucible, Pa.—Contract closed (by Heyl & Patterson, Inc.) with Eimco Corp. for complete vacuum-filter installation handling 33 tph of minus 28-m coal.

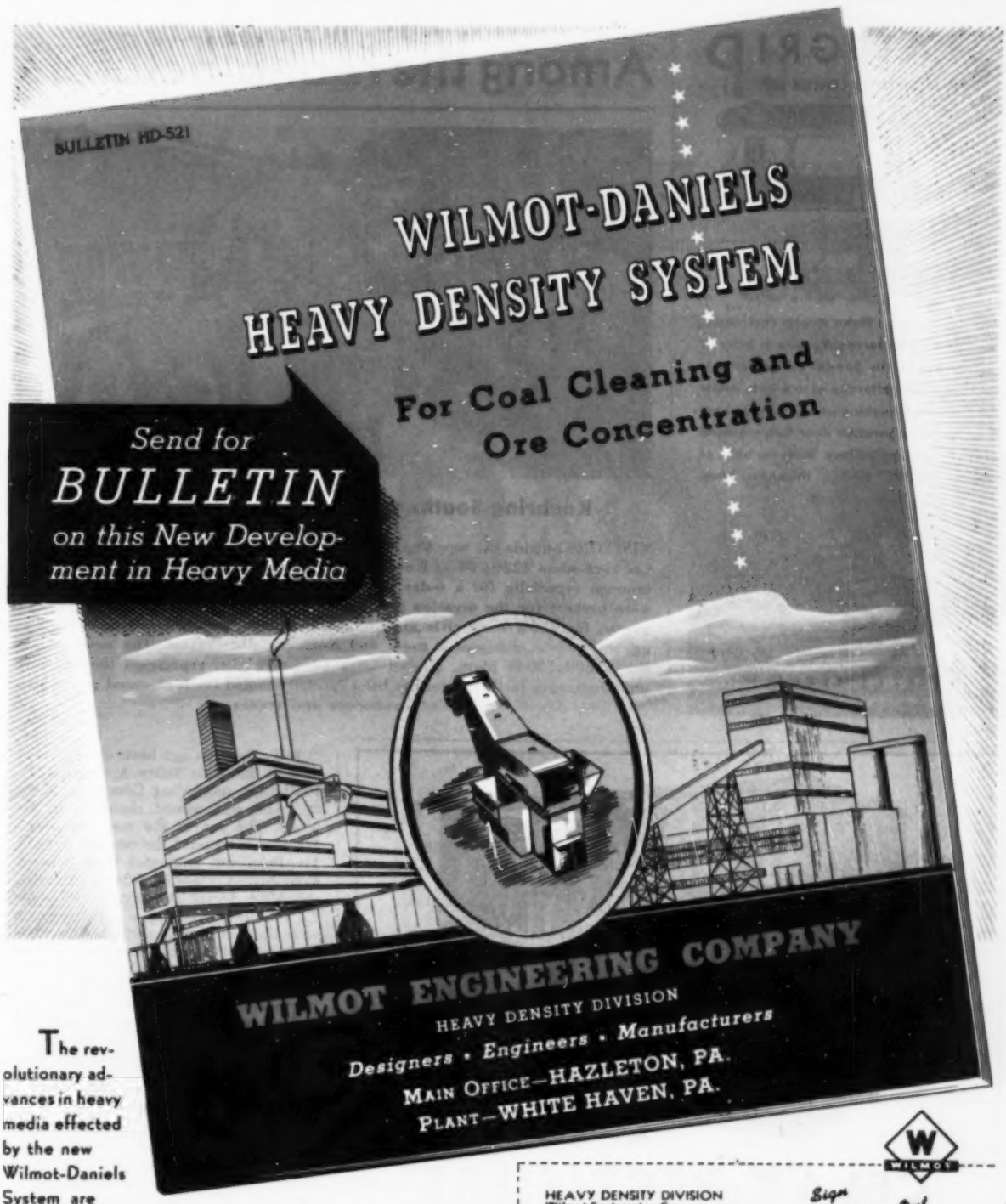
Altmire Bros. Coal Co., Inc., Apolla, Pa.—Contract closed with Jeffrey Mfg. Co. for one No. 100 unit washery, cleaning 5 x ½ at 60 tph.

William Aloe Coal Co., Imperial, Pa.—Shipment by Deister Concentrator Co. of three No. 7 SuperDuty Diagonal-Deck coal washing tables.

Rochester & Pittsburgh Coal Co., Kent No. 1-2 mine, McIntyre, Pa.—Shipment by Deister Concentrator Co. of two No. 7 SuperDuty Diagonal-Deck coal washing tables.

Pine Creek Coal Co., Spring Glen, Pa.—Shipment by Deister Concentrator Co. of two No. 7 SuperDuty Diagonal-Deck coal washing tables, cleaning Nos. 1 and 2 buck anthracite.

Milburn By-Products Co., Milburn, W. Va.—Contract closed with McNally Pittsburg Mfg. Corp. for one 2030 McNally-Norton unit washer addition to present preparation plant to treat 5 x ¾ raw coal at 50 tph; washed coal classified over one 3 x 10 double-deck horizontal vibrating, dewatering screen classifying 1¾ x 28-M.



The revolutionary advances in heavy media effected by the new Wilmot-Daniels System are suggested by the following: (1) Solves two most common heavy-media problems, fluctuation of bath density and loss of product to refuse. (2) Requires 50% less floor space. (3) Contains 5 less major parts and 4 less motors. (4) Employs many standard parts for greater ease of maintenance. (5) Custom-made to fit floor space. For complete details of how the Wilmot-Daniels System is cutting costs for coal and metal producers see Bulletin 521.

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Wilmot Engineering Co.
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Sign Tear Out Mail

Send us Bulletin 521 on new Wilmot-Daniels Heavy-Density System for coal cleaning and ore concentration.

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Company .....

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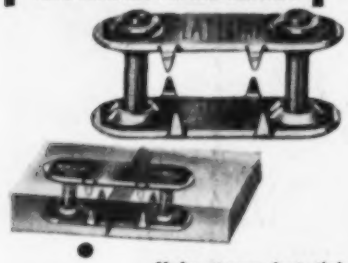
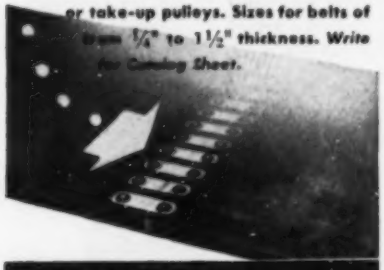
MINERAL AND COAL CLEANING EQUIPMENT

PLATEGRIP
PLATE FASTENERS FOR CONVEYOR BELTS



Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of [illegible] ¼" to 1½" thickness. *Write for Catalog Sheet.*



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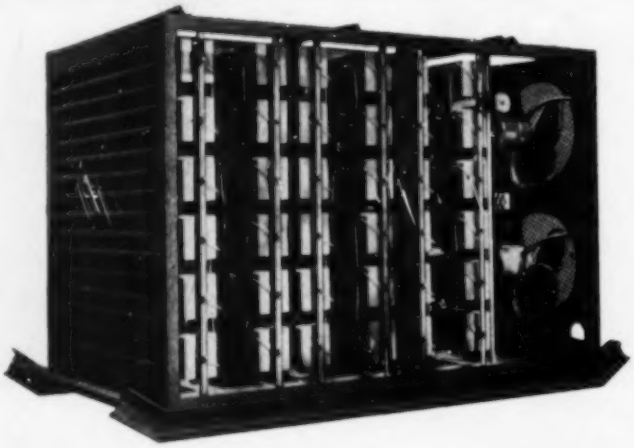
Among the Manufacturers

Koehring-Southern Opens Chattanooga Plant

VISITORS outside the new Chattanooga, Tenn., plant of the Koehring-Southern Co. view some $220,000 of Koehring and subsidiary products brought to Chattanooga especially for a 6-day open-house celebration. Top company officials were present for the occasion and each day was devoted to a special group of guests, including local civic and industrial groups, publishers, employees and general public, equipment users and Koehring distributors. The newly established 800x120-ft plant, located on a 17½-acre site, represents the latest in manufacturing facilities and has been specially tooled for high-speed production of excavators and cranes.



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ALL SIZES FROM 25 TO 500 K.W.
CLARK ELECTRONIC CORP.
BOX 165, PALM SPRINGS, CALIF.

J. T. Ryan Jr. has been elected president of the Mine Safety Appliances Co., Pittsburgh, succeeding George H. Deike Sr., who was named chairman of the board. The son of the man who, with Mr. Deike, founded the concern in 1914, Mr. Ryan was graduated from Pennsylvania State College in 1934 and received and MBA degree at Harvard. He began his business career as a sales engineer with the company in 1936 and in 1948 was elected to the board of directors and named executive vice president. Mr. Deike received his BS degree in Mining Engineering at Penn State in 1903 and, in 1948, was awarded a graduate degree of Engineer of Mines by the college. He had been president of the company since it was founded nearly 39 yr ago. C. P. Rooney has been named treasurer. Associated with the company since 1927, he was elected assistant secretary in 1940 and assistant treasurer in 1948. Later, the election of George H. Deike Jr. as MSA vice president was announced by Mr. Ryan. Mr. Deike has been with the company since his graduation from Penn State College in 1931, when he joined its engineering department, and since 1951 has been director of engineering and secretary of the company.

Deister Concentrator Co., Ft Wayne, Ind., at its annual meeting, elected the following officers: R. T. Bliss, in charge of anthracite field activities for many years, was made vice president in charge of sales and service for the Anthracite Dist. D. N. Griffin, formerly chief engineer, was promoted to vice president;

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with headquarters continuing at the company's main office at Ft. Wayne. S. A. Stone, formerly engineer, was promoted to chief engineer to succeed Mr. Griffin.

Combustion Engineering-Superheater, Inc., New York, at the recent annual meeting, acted to shorten the company name to Combustion Engineering, Inc.

Ohio Brass Co., Mansfield, Ohio, has transferred W. R. Cress to the Chicago area as a district manager, succeeding M. R. Gowing, who resigned to join the J. S. G. Electric Co. V. L. Crabb has been named district manager in the Cincinnati area. Mr. Cress, who joined Ohio Brass in 1948, was district manager of the Cincinnati territory since 1951. Mr. Crabb joined the Mansfield engineering staff in 1941 and since 1950 has been in Mansfield handling engineering duties in the company's power utilities sales.

Banks Miller Supply Co., Huntington, W. Va., has announced the following appointments in its organization: president, George W. Bishop, who will continue also as president of the Williamson Supply Co.; sales manager, John B. Churton, formerly sales representative in the Kanawha territory; and assistant general manager, J. W. Hall, formerly mechanical department manager. Jack C. Morton, of Beckley, has been named sales representative in the Kanawha territory.

Joseph L. Walker, formerly in charge of coal-preparation extension services at Pennsylvania State College, has joined Heyl & Patterson, Inc., Pittsburgh.

James A. Ross, who for 30 yr has headed Sprague & Henwood, Inc., Scranton, Pa., has been made chairman of the board, in which capacity he will continue to be active with the company. Adrian E. Ross, formerly assistant to the president and chief engineer, has been elected president, and William J. Schank, vice president, has been advanced to senior vice president and general manager.

Atlas Powder Co., Wilmington, Del., has elected Ralph K. Gottshall president of the company and chairman of the executive committee, succeeding Isaac Fogg, who retired from those posts in accordance with company policy. Mr. Fogg, who joined the company on its organization in 1913, has been made chairman of the board and will also continue as chairman of the finance committee. Mr. Gottshall joined Atlas in 1927 and has been a director and member of the executive committee since 1951 and executive vice president for the past year.

Westinghouse Air Brake Co. has announced its acquisition, for approximately $19,500,000, of the earthmoving tractor and related business of R. G. LeTourneau, Inc., its international sales and distribution organization and its Peoria, Ill., and Toccoa, Ga., plants. The LeTourneau Co. will retain and continue to operate plants in Vicksburg.

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MOTORIZED
HEAD PULLEYS
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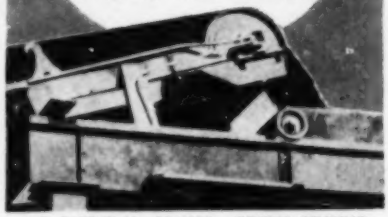
CONVEYOR
DOWNTIME
70% to 90%



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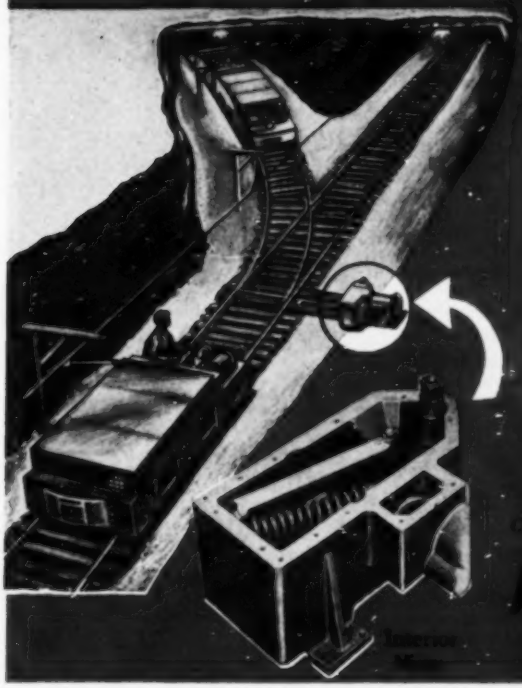

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Promet XXX will not score, cut or powder even in lubrication failures. The coefficient of friction is considerably less than that of tin babbitts, thus reducing power loss and wear. The entire bearing surface wears uniformly, without pitting.

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Ideal for use in blowers, cement mills, clay working machines, compressors, conveyors, crushing machinery, diesel engines, dredges, fans, machine tools, mining machinery, motors and generators, paper mills, pumps, rock and gravel plants, saws, steel mill bearings and sugar mills.

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Joy Mfg. Co., Pittsburgh, has announced the resignation of Dr. T. H. Troller as engineering vice president. He will continue, however, to serve the company in a consulting capacity. Dr. Troller was for 15 yr a director of the Guggenheim Airship Institute and had been serving La Del Conveyor & Mfg. Co. as a consultant. When that organization became part of Joy, he was made engineering vice president.

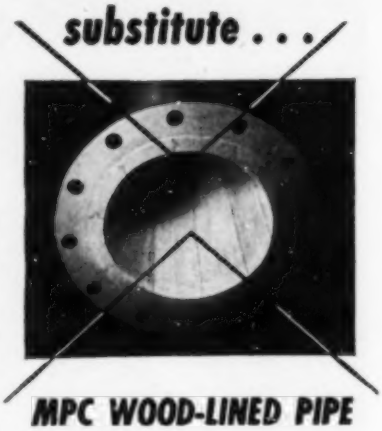
Kenneth H. Colville Jr. has been elected secretary and a member of the board of directors of the Hendrick Mfg. Co., Carbondale, Pa. A great grandson of Eli E. Hendrick, company founder, Mr. Colville has been associated with the firm since 1940.

Schroeder Bros., Pittsburgh, has named Jason C. McGuire southern district representative, handling sales in southern West Virginia, eastern Kentucky and western Virginia. Before joining Schroeder Bros., Mr. McGuire was an inspector and examiner with the West Virginia Dept. of Mines, and a salesman for the Mining Div., Kennametal, Inc.

Boston Woven Hose & Rubber Co., Cambridge, Mass., has made three appointments in its expanded research and development department. Donald Johnston becomes manager of hose development; Edward E. Stritter, plastics development manager; and William E. Wells, head of the belt development division. BWH is extending its research and development center's facilities specifically to devise new, better, lower priced products, to improve, if possible, existing processes and machines, or to pioneer entirely new ones, reported James N. Mason, research director, in announcing the appointments.

International Harvester Co., Motor Truck Div., Chicago, has announced the following changes: Chauncey L. Sears has been named manager of the Harrisburg district sales, succeeding M. H. Roth, transferred to Seattle, Wash., in a similar capacity. Mr. Sears was motor truck district sales manager at Columbus, Ohio, for the past 4 yr, and previously was assistant district manager in Harrisburg. Mr. Roth served at Seattle and Oakland, Calif., prior to moving to Harrisburg in 1949. J. H. Baker, manager at Seattle for the past 10 yr, succeeds Mr. Sears.

there is NO substitute . . .



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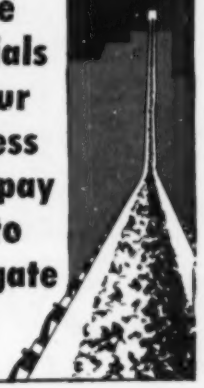

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Shown in Illustration Below

2 HYDRAULIC FLUID MOTOR DRIVE
Hose Coupled to Remote Power Unit

3 HYDRAULIC CYLINDER TYPE
Hose Coupled to Remote Power Unit

These three Nolan models will help you meet every requirement and condition in spotting cars for loading . . .

and may save you as high as 40 minutes per shift!

The Nolan Porta-Feeder has been in successful use in many mines for over two years. This modern method of moving cars has been accepted as the most efficient in the industry. Its ease of installation and quick movability recommends its use in any mine.

The Porta-Feeder mounts between the rails on top of the track ties, and is secured by jacks. Little or no excavation or preliminary foundation work is necessary. The construction is strong and massive. There are no ropes or cables. Reciprocating pushing dogs deliver constant forward feeding motion. We will be glad to show you a mine in your vicinity where the Nolan Porta-Feeder is operating. Write us now.

NOLAN

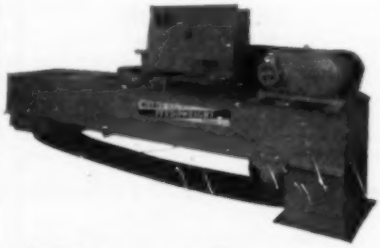
THE NOLAN COMPANY 106 PENNSYLVANIA ST. BOWERSTON, OHIO

COAL MEN ON THE JOB . . .

Stearns Coal & Lumber Co., Mine No. 18, Blue Heron, Ky.

SAMPSON ABBOTT (left), tipple foreman; Luther B. Ledbetter, electrician helper; Lee Baker, mine electrician; Jasper Tapley, Ottis Tucker and Inman Newport, section foremen.

Pittsburgh Coke & Chemical Co., Pittsburgh, has named Alan S. Evans Jr. manager of the coal chemicals division, succeeding the late F. D. Schreiber. Mr. Evans joined Pittsburgh Coke in 1942 and has been in charge of the firm's coal chemicals sales for some years.



Yes-feed by weight

with the MERRICK FEEDOWEIGHT, a self-contained automatic conveyor scale, with automatic gate for feed rate control. Powered feed regulator operates gate, without restraint on scale beam. Uniformly feeds bulk material BY WEIGHT; automatically totalizes weight of materials fed. Simple to operate. Slow moving parts mean long life. Easy to install, maintain.

Manufacturers of

The Merrick WEIGHTOMETER, which weighs any material carried on a belt conveyor without interrupting conveying operation. Complete descriptive matter on request.

MERRICK SCALE MFG. CO.
Engineers and Mfrs. of Automatic Weighing Equipment
PASSAIC, N. J.

TO HELP SELL COAL...

BCI Advertises to the Industrial, Commercial and Institutional Markets.

Each month, full-page messages like the one shown below—featuring either "off-track" or "on-track" installations—appear in the pages of *Business Week*, *Nation's Business* and a carefully selected group of power journals and trade magazines.

"BURNING COAL THE MODERN WAY CUT OUR POWER COSTS $51,000 A YEAR!"

"Up-to-date coal installation cut fuel consumption 20.3% ... labor force 47%!"

says Mr. George E. Bennett, Supt. Motive Power, Chicago & Eastern Illinois Railroad.

"We recently modernized the power plant at our Oaklawn Shops in Danville, Illinois. The savings we've realized in labor and fuel proved to us you can't beat *bituminous* coal burned with modern equipment."

Here's the new power plant of the C&EI Railroad's Oaklawn Shops at Danville, Illinois. By burning coal the modern way this plant saves a total of $51,180 a year—*will pay for itself in less than seven years.*

This is a view of the firing aisle showing the spreader stokers which are fed by a weigh larry. Three new boilers now do the work that formerly required seven. Man-days per week required to operate the plant have been reduced from 112 to 59!

● Low price—dependable supply—safe storage—coal gives you all these no matter how you burn it.

But you can get much more!

Get more steam for every dollar—burn coal in a *modern* combustion installation. Cut your labor costs—install automatic coal and ash handling equipment. If you call in a consulting engineer—he can show you how coal can do a better job for you with equipment designed to meet your *specific* needs.

Of all the fuels, coal alone has virtually inexhaustible reserves. And to supply this coal, America has the world's most productive and efficient coal industry. That's why you can count on coal for dependable supply, relatively more stable prices—now—and in the future, too!

If you operate a steam plant, you can't afford to ignore these facts!

COAL is in most places is today's lowest cost fuel.

COAL resources in America are adequate for all needs—*for hundreds of years to come.*

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

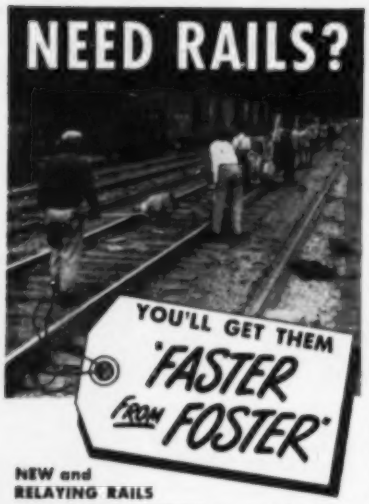
COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

BITUMINOUS COAL INSTITUTE

A Department of National Coal Association, Washington, D.C.

FOR HIGH EFFICIENCY — FOR LOW COST

YOU CAN COUNT ON COAL!



NEW and RELAYING RAILS

Depend on *FOSTER* to match sizes and specifications to meet all your requirements on any job—new installations or replacements.

***Everything for* INDUSTRIAL TRACK**

Switch Material, Track Accessories and Tools—Prompt shipments from our five nationwide warehouses.

Write for Rails, Switch Material or Track Accessories Catalogs C-6.

L. B. FOSTER CO.

STEEL SHEET PILING • PIPE • WIRE ROPE

Pittsburgh 30, Pa. • New York 7, N.Y.

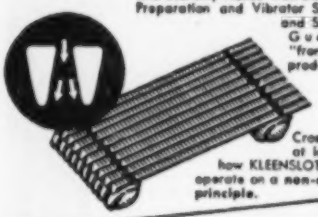
Chicago 4, Ill. • Houston 2, Tex. • Los Angeles, Calif.

Kleenslot

WEDGE-WIRE PREPARATION SCREENS

FOR DEWATERING, SIZING AND SCREENING OPERATIONS

The mining industries can't afford to overlook this product. Accurate openings, great strength, long life and economy makes WEDGE-WIRE Preparation and Vibrator Screens and Screen-Guards "front line" products.



Cross section at left shows how KLEENSLOT Screens operate on a non-clogging principle.

WEDGE WIRE CORP.
5608 Clark Ave., Cleveland 2, Ohio

Gentlemen:
Please send us literature outlining the superiority of Wedge Wire construction.

COMPANY _____

NAME _____

ADDRESS _____

SEND FOR OUR ILLUSTRATED LITERATURE

Wedge-Wire CORPORATION

5608 CLARK AVENUE
CLEVELAND 2, OHIO

Sprague & Henwood, Inc., Scranton, has reported plans to establish a new western branch office in Grand Junction, Colo., as a result of its heavy volume of exploration work in the western mining field. The several large contracts totaling approximately 270,000 ft of diamond core drilling for uranium-ore exploration in the Colorado Plateau area recently awarded the company represent about 51 mi of drilling if the holes were laid end-to-end.

United States Rubber Co., New York, has named Harold M. Winton, formerly training director, mechanical goods division, to the newly created post of sales-development manager. Associated with U. S. Rubber since 1946 when he joined the tire-sales training department, he was appointed director of personnel and training for the mechanical goods division in 1950.

Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, has elected F. M. Galloway vice president in charge of research and development. Joining Quaker in 1933 as assistant chemist, he has been successively chief chemist and technical superintendent and has been a Quaker director since 1947.

Gardner-Denver Co. has announced that Robert H. Pearson, associated with the company for 37 yr, has retired as a vice president, and will move to Denver to assume management of Air Rentals, Inc., a newly formed organization distributing Gardner-Denver and other equipment. Mr. Pearson joined the Denver Rock Drill Co. in 1916, and became associated with the Gardner-Denver organization when the Denver firm merged with the Gardner Governor Co. in 1927. Other sales personnel changes also announced were: C. M. George, named sales administrator; O. C. Knapheide Jr., sales manager, Oilfield & Industrial Div.; C. H. Rieman, sales manager, Mining & Contracting Div.; J. R. Affre, sales supervisor, Oilfield & Industrial Div.; E. A. Linneman, sales supervisor, Contracting Div.; and J. A. Caverly, sales supervisor, Mining Div.

Gar Wood Industries, Wayne, Mich., has named D. J. Byrd assistant sales manager of the Wayne Div. Joining Gar Wood in 1947 as a salesman with the Washington, D. C., branch, he served as Wayne division district manager for the southeastern section of the country prior to his new appointment.

Union Carbide & Carbon Corp. has elected Thomas D. Cartledge a vice president. Mr. Cartledge has been president of Linde Air Products Co., a division of Union Carbide, since May, 1952. He joined Linde as a salesman after World War I, becoming district manager in Kansas City, and later in Dallas. In 1925 he was transferred to the general sales management staff, in 1940 was elected vice president and 4 yr later became senior vice president, director and a member of the executive committee.

Norton Co., Worcester, Mass., has appointed Rodger C. Swift abrasive engi-

Removing a four-foot core from the corebarrel of a Sprague & Henwood contract drilling rig at an iron ore property in Northern New York.

Good Cores

from ANY formation

The efficient organization and equipment developed during more than sixty years of successful world-wide experience in contract diamond drilling enable us to obtain a high percentage of core from any rock or ore formation. Unfavorable conditions are overcome, in many cases, through the use of special tools developed by our own engineers and manufactured in our own extensive shops.

Besides all types of exploratory drilling for coal and ore, our service includes foundation testing and pressure grouting. Experienced crews and supervisors are available for service anywhere in the United States and most foreign countries. Estimates submitted on request.

The same high-speed drilling machines, improved diamond bits and complete accessory equipment used by our own crews are available to other diamond drill operators. Write for Bulletin 320 and tell us about your operating conditions. Our experienced executives welcome opportunities to make money-saving suggestions.

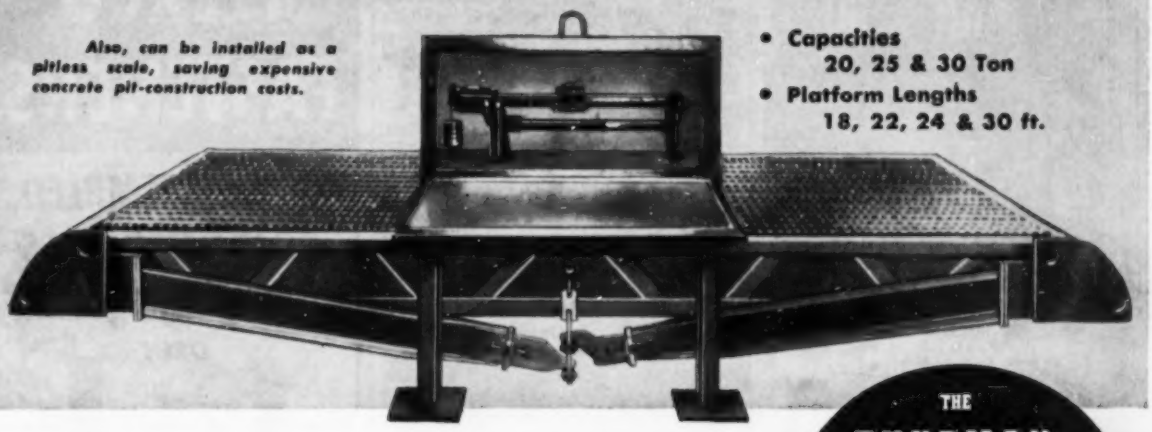
Sprague & Henwood, Inc.

SCRANTON 2, PA.

See our 4 page insert in McGraw-Hill Mining Catalogs

THIS SCALE CAN BE MOVED FROM JOB TO JOB, AS A UNIT

Also, can be installed as a pitless scale, saving expensive concrete pit-construction costs.



- **Capacities**
  20, 25 & 30 Ton
- **Platform Lengths**
  18, 22, 24 & 30 ft.

ACCURATE and PORTABLE

This scale can be transported, assembled, from one job to another by removing six bolts which hold the side levers in place. The complete scale can then be lifted as a unit and loaded onto a truck as a unit. It can be readied for use in minutes.

WIDE STEEL BASES

This scale requires no concrete footing. The steel bases at both ends support the scale perfectly. The easy-to-read weighbeam is chrome-plated. Other vital parts are electroplated against corrosion. Write for additional information and prices.

THE
THURMAN PORTABLE TRUCK SCALE

Est. 1918

Other Thurman weighing equipment: Pit Scales—Pitless Scales—Wheelbarrow scales—Warehouse scales, to fit your requirements

THURMAN MACHINE CO. *SCALE DIVISION* 156 North Fifth Street Columbus, Ohio Dept. B

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prefabricating pipe

specialists

Albert's Prefabrication meets the most exacting specifications for Oil, Chemical, Concrete, Asphalt, and other industrial requirements.

Butt Welds • Bending All Types • Coiling • Machining • Threading • Beveling • Lining • Pickling • Galvanizing • Sand Blasting • Preheating • Stress Relieving • Testing •

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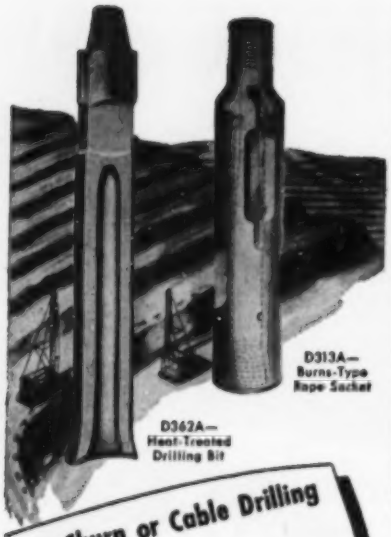
Piling — Sheet piling-lightweight-Tubular all sizes.

Pile Fittings — All types and sizes for steel and wood.

Write for Free Prefabrication Booklet.

ALBERT pipe supply co., inc. BERRY AT NORTH 13TH ST. • BROOKLYN 11, N. Y.



For Churn or Cable Drilling
of
• BLAST HOLES
• PROSPECT HOLES
• SAMPLING
SAFE • EFFICIENT • ECONOMICAL

Spang Churn or Cable Tools are top performers in their fields for drilling test holes when prospecting or sampling . . . drilling blast holes for fragmentation of minerals or overburden . . . drilling and reaming escape, dewatering and ventilating holes . . . and drilling wells for other purposes. Fifty years' experience serving oil, water-well, mining and quarrying operations assures their value.

neer in the central Illinois territory. Associated with Norton since 1940, he was in foreign sales covering South America since 1946. John W. McCue, who formerly covered the territory, has been assigned to the Chicago area, succeeding William N. Jove, who joined the staff of field engineers at Chicago.

Sterling Electric Motors, Inc., Los Angeles, has named John R. Howell and Robert T. Dudley, regional sales managers. Mr. Howell, associated with the company for almost 24 yr, will serve as sales manager for the western part of the United States, with headquarters in Los Angeles, while Mr. Dudley, who joined Sterling in 1949, will cover the eastern area, with offices in Chicago.

Bausch & Lomb Optical Co., Rochester, N. Y., has elected Lysle B. McKinley vice president in charge of scientific instrument sales. With the company since 1929, he was appointed administrative assistant to the vice president of the Scientific Instrument Div. in 1946 and a year later was promoted to sales manager of the division.

Ingersoll Products Div., Borg-Warner Corp., Chicago, has named R. B. Crean administrative assistant to the president of the division. Mr. Crean resigned as vice president, Eddystone Div., Baldwin Lima-Hamilton Corp., to assume this position and previously, was comptroller of the National Electrical Mfrs. Association.

R. G. LeTourneau, Inc., Peoria, Ill., has promoted J. A. Vincent to eastern area sales manager and H. R. Gilmore to succeed him as district sales representative for the southeastern U. S. Mr. Vincent joined LeTourneau's field engineering staff in 1948 and was appointed southeastern representative the next year. Mr. Gilmore, whose headquarters will be in Atlanta, has served LeTourneau on numerous assignments in both the domestic and export fields for the past 9 yr.

Koehring Co., Milwaukee, Wis., has appointed the Ray C. Call Co. distributor for West Virginia. Located in S. Charleston, the new distributor, managed by Everett C. Call, will handle the complete line of Koehring products as well as equipment manufactured by the three Koehring subsidiary companies; Parsons Co., C. S. Johnson Co., and Kwik-Mix Co. E. J. Hartlein has been named district representative for Koehring's central-northwest sales territory, including Minnesota, North Dakota, South Dakota, Nebraska, Iowa and Kansas.

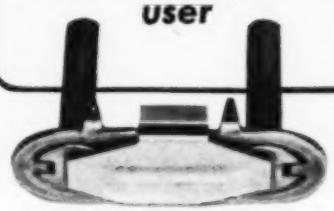
Pioneer Pump Div., Detroit Harvester Co., Detroit, has appointed Virginia Electric, Inc., Charleston, W. Va., exclusive representative in West Virginia and the adjoining counties of Virginia, Ohio and Kentucky. Shop Supply Co., 2412 Second Ave., Birmingham, Ala., has been named to represent the division in Alabama, Georgia, and Tennessee.

Reliance Electric & Engineering Co., Cleveland, has established a new Baltimore branch office, located at 13 W. 25th St., to broaden its sales application and

FLEXCO FASTENERS

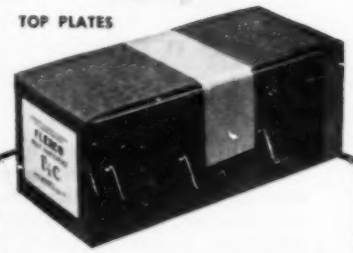
with ASSEMBLED BOTTOM PLATES

For the large quantity user



ASSEMBLED BOTTOM PLATE

TOP PLATES



You can now save assembling time at *no increase in price!*

FLEXCO Conveyor Belt Fasteners with assembled bottom plates, are available in "C" cartons of 100 complete sets each.

Parts are kept separate in the carton.

Made of Steel, Stainless, Monel, Everdur and Promal — order them in "C" cartons.

See Your Supply House

Bulletin F-106 Gives Complete Details

FLEXIBLE STEEL LACING CO.
4630 Lexington Street
Chicago 44, Illinois

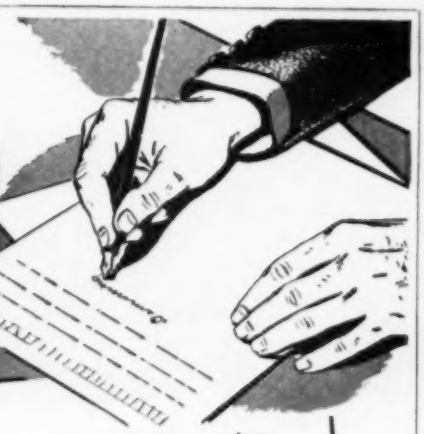
technical engineering service to customers in the tri-state area embracing south central Pennsylvania, Maryland and Virginia. The office is staffed by A. C. Schettler and W. C. Mitchell, sales engineers.

Euclid-Memphis Sales Inc. has established a subsidiary firm in Arkansas to provide better service for Euclid owners in the state. Known as Euclid-Arkansas, Inc., with headquarters at 702 W. Second St., No. Little Rock, it will provide sales and service throughout Arkansas with the exception of six counties. R. A. Trippeer has been named president; J. C. Mitchell, vice president and general manager; R. T. Vawter, parts manager; R. M. Greer, service manager; and Worthington Brown, secretary-treasurer. Sales are handled by Mr. Mitchell and Dan Carragher.

National Electric Products Corp. executive and general sales offices are now located at Gateway Center, 140 Stanwix St., Pittsburgh 22.

Builders Iron Foundry, Providence, R. I., has acquired an additional 87,000 sq ft of manufacturing space, its second expansion in the past 4 yr and another step forward in the consolidation of its manufacturing, office and engineering activities in this area begun in late 1949, the company reports. The new building increases the total shop and office space to 258,000 sq ft. Present plans call for use of 15,000 sq ft in the new building by an affiliate, the Omega Machine Co.

Specify DEMING Mine PUMPS



• Continuous performance under severe conditions at low operating and maintenance costs make DEMING MINE PUMPS your dependable source for pumping equipment. The complete line offers you a wide selection for types, sizes and capacities. Two examples are illustrated.

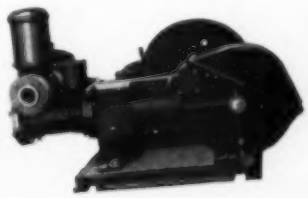
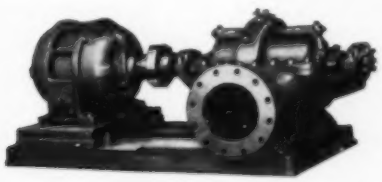


Fig. 1896 "Oil-Rite" Double-Acting Mine Pump, 5 and 6-inch stroke. Several types of drives available. Capacities range up to 100 gallons per minute.



Single Stage, Split Case Centrifugal Pumps, Figs. 5010, 5020 and 5030. Full range of capacities up to 4,000 gallons per minute.

Refer your pump requirements to your Deming Distributor. He will be glad to cooperate with you. Write for Bulletin 1000-A which explains the various types of Deming Mine Pumps.

THE DEMING COMPANY
533 BROADWAY • SALEM, OHIO

"there's nothing better!"
says Stan Thiess of Thiess Bros. Pty. Ltd. Australia

McCarthy Mobile-Mount Vertical Drills

• Thiess Bros. Pty. Ltd., one of Australia's largest excavating and earthmoving companies, moves approximately 10,000 tons of overburden to recover 2,500 tons of coal daily. Two sturdy, dependable McCarthy Mobile-Mounted Vertical Drills drill through shale, sandstone, slate and some hard stone strata. Drilling through overburden, ranging from 15 ft. to 50 ft. to the top of the coal seam, the two McCarthy Drills each average between 280 to 300 ft. per day . . . about 3,000 ft. in a five-day week. Best daily performance for one drill . . . 430 ft. You can realize time and money-saving results on your job. Write today for all the facts on the McCarthy Drill . . . the toughest, fastest, most efficient unit ever made.

DRILLING EQUIPMENT SINCE 1901

SALEM

THE SALEM TOOL CO.
763 SOUTH ELLSWORTH AVE.
SALEM, OHIO, U. S. A.

"I could see the corpsman kneeling over me. The blood plasma was running down through a tube into my arm and he said everything was going to be O.K. I was walking across an enemy mine field in Seoul when one exploded and a piece of shrapnel caught me in the leg.

" 'Got enough of that stuff?' I asked him, pointing to the blood. 'I guess we never have enough,' he said, 'but you can thank *somebody* for this pint.'

"How do you thank 'somebody' for blood? For saving your life? When I got back home, I discovered the answer at my local blood donor center. There's only *one* way to say thanks—by giving some of your own blood."

"How do you thank 'somebody' for Blood?"

Yes, all kinds of people give blood—for all kinds of reasons. But whatever *your* reason for giving blood, this you can be sure of: Whether your blood goes to a combat area, a local hospital, or for Civil Defense needs—this priceless, painless gift will some day save an American life!

Business Executives!

√Check These Questions!

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ☐ Have you given your employees time off to make blood donations?
- ☐ Do you have a Blood Donor Honor Roll in your company?
- ☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?
- ☐ Have you arranged to have a Bloodmobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed employees of your company's plan of co-operation?
- ☐ Was this information given through Plant Bulletin or House Magazine?
- ☐ Has your company given any recognition to donors?
- ☐ Have you conducted a Donor Pledge Campaign in your company?

Remember, as long as a *single* pint of blood may mean the difference between life and death for *any* American . . . the need for blood is *urgent!*

Give Blood Now—Call Your Red Cross Today!

National Blood Program

SEND FOR FREE BULLETINS TODAY!

. . . Here is GUARANTEED MAGNETIC PROTECTION for INDUSTRIAL and PROCESSING USES!

MAGNETIC PLATES—Std. widths 4" to 26"; Lengths and number of poles as required. Specials on order.

MAGNETIC PULLEYS—Std. diameters 12" to 30"; Belt widths from 4" to 60". Larger sizes on order.

MAGNETIC PULLEY UNITS—Pulley sizes from 12" to 30" dia., belt widths 4" to 60". Length of unit as desired.

MAGNETIC DRUMS—Std. diameters 12" to 30"; Face widths 4" to 60", with or without enclosures.

MAGNETIC PIPE DUCTS—Available in line sizes from 4" up to 12", for either air or gravity systems.

MAGNETIC LIQUID TRAPS—Line sizes to 4" for Sanitary or Industrial uses. Standard or heavy-duty models.

MAGNETIC HAND AND ROAD SWEEPERS—Available in Standard, Heavy-duty or Hi-Intensity Models. Sweep widths 12", 18", 24", 36", 48", 60" and 72".

THE HOMER MANUFACTURING CO. Inc., Dept. 59, LIMA, OHIO

CORE DRILLING

—anywhere

"We look into the Earth"

PENNSYLVANIA Drilling CO.

DRILLING CONTRACTORS AND MFRS.

1205 Chartiers Ave. **Pittsburgh, Pa.** WAlnut 1-5816

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EUROPEAN MANUFACTURING RIGHTS

Well known British Engineering Company, already having European manufacturing and selling arrangements with American Firms, desires to acquire rights to make and sell additional machinery lines. Comprehensive Works and Sales Organization.

Representative will be in U.S.A. in June

Write: Sheepbridge Engineering Ltd.
c/o Hardinge Brothers, Inc.
269 Lafayette Street, New York 12, N.Y.

A copy of this quick-reading, 8-page booklet is yours for the asking. It contains many facts on the benefits derived from your business paper and tips on how to read more profitably. Write for the "WHY and HOW booklet."

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McGraw-Hill Publishing Company, Room 2710, 330 West 42nd St., New York 36, N. Y.

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POSITION WANTED & INDIVIDUAL SELLING OPPORTUNITY wanted undisplayed advertising rate is one-half of the above rate, payable in advance.
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INFORMATION:
BOX NUMBERS care of publication count as 1 line additional.
DISCOUNT OF 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).
EQUIPMENT WANTED OR FOR SALE Advertisements acceptable only in Displayed Style.

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The advertising rate is $9.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. C.A.

NEW ADVERTISEMENTS: Address N.Y. office, 330 W. 42 St., N.Y. 36, for July issue. Closing June 18th.

Columbia Coke Ovens, Sunnydale Housing Development, land and water rights, in Carbon County, Utah

Kaiser & Frazer Parts Corporation, Willow Run, Michigan, invites proposals to purchase on an "as is" basis the property in Carbon County, Utah, listed below:

Parcel A: ***500 beehive coke ovens,*** *located* near Columbia, together with certain water rights.

Parcel B: ***60 houses and 6 vacant lots*** in the Sunnydale Subdivision, located at Sunnyside.

Parcel C: ***550.5 acres (more or less) of land and water rights,*** lying approximately 3 miles west of Parcels A and B.

Sealed proposals for the purchase of any one or all of the above-listed properties, subject to the provisions of the brochure referred to below, will be received at the office of:

Coverdale & Colpitts
120 Wall Street, New York 5, N. Y.

until noon on July 31, 1953.

Parcel A was constructed by Defense Plant Corporation as a part of Plancor 687 during 1942-1943 and was acquired by Kaiser & Frazer Parts Corporation from Reconstruction Finance Corporation in January 1948.

The coke ovens were operated by Kaiser & Frazer Parts Corporation from May 1948 to May 1949 and produced 194,065 tons run-of-oven coke. The rated capacity is 21,000 tons per month. The best production in any one month was 19,774 tons in November 1948.

Kaiser & Frazer Parts Corporation, subsequent to acquisition of this property, expended substantial funds on the coke oven plant. The property is reported to be in good stand-by condition.

Parcel B covers 60 houses which were constructed for Kaiser & Frazer Parts Corporation during the year 1948, in a community in which water, sewage and electric lights are available, and 6 additional lots on which no improvements have been made. Fifty-nine of the houses are mortgaged under FHA loans to the First Security Bank of Utah, National Association, of Salt Lake City. The aggregate amount outstanding on April 30, 1953 was $344,580.

Parcel C was acquired by Kaiser & Frazer Parts Corporation in 1948 to secure an additional source of water for its coke oven and housing development properties.

Columbia and Sunnydale are located approximately 148 miles from Salt Lake City.

Copies of a brochure further describing each of the properties and giving information for bidders as to the terms on which the property will be sold, together with information as to titles, obligations and contracts outstanding, and other pertinent information, may be obtained by application to:

Coverdale & Colpitts
120 Wall Street, New York 5, N. Y.

Arrangement for examinations of the properties will be made on application. Copies of essential contracts, mortgages, etc., may be inspected at the offices of:

Kaiser & Frazer Parts Corp.
Willow Run, Michigan
or
Coverdale & Colpitts
120 Wall Street, New York 5, N. Y.

Detailed drawings of the coke ovens may be inspected at the first-named location.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42 St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

ECONOMIST WANTED—TVA wants qualified applicants for the position of Chief, Fuels Economics Section, Chattanooga, Tennessee. This Section is responsible for forecasting fuel requirements (principally coal); analyzing costs of fuel and forecasting changes in such costs; recommending size and timing of invitations for bids, nature and term of contracts, provisions for cancellation, escalation, etc.; and analyzing comparative coal transportation costs. A college graduate with 5 to 10 years' experience in such work with some supervisory responsibility is desired. Entrance salary is $7500 a year for 40-hour week. Vacation, sick leave, and retirement benefits. Write to Tennessee Valley Authority, Division of Personnel, Knoxville, Tennessee.

BUSINESS OPPORTUNITY

License to Manufacture
German firm will license for manufacture and sell to the American Coal field steel pit props, which are today used by thousands in Europe. Invention patented in Germany and internationally. Interested firms write to: BO 7840, Coal Age.

Strip Coal Wanted
Lease or purchase—large or small tracts. Morgan Coal Company, 2850 North Meridian Street, Indianapolis 8, Indiana.

Your inquiry will have Special Value . . .

If you mention this magazine, when writing advertisers. Naturally, the publisher will appreciate it . . . but, more important, it will identify you as one of the men the advertiser wants to reach with this message . . . and help to make possible enlarged future service to you as a reader.

Auction Advertising page 222, Equipment Wanted page 220

We have recently purchased several complete coal plants and have available an excellent stock of all types of machinery. Below is just a partial listing of our complete stock of mining, electrical and industrial equipment.

LOCOMOTIVES

1—1½ ton Mancha "Trammer", 18" ga.
1—2 ton Whitcomb, battery, 24" ga.
1—4 ton Mancha, battery, 24" ga., with Edison batteries and charging set
1—4 ton Ironton, battery, 36" ga.
2—7 ton G. E. permissible battery, 36" ga.
1—7 ton Atlas, battery, 36" ga.
3—8 ton Ironton, 36" ga.
2—8 ton General Electric, battery 36" ga.
4—10 ton Atlas, battery, 36" ga.
1—3 ton Whitcomb gas engine driven, 24" ga.
1—2½ ton Jeffrey trolley, 36" ga.
1—4½ ton Goodman trolley, 36" ga.
1—5 ton Jeffrey trolley, 36" ga.
1—6 ton Goodman trolley, 36" ga.
2—8 ton Goodman trolley, 36" ga.

COAL CRUSHERS

1—24" x 24" Jeffrey Single Roll
1—24" x 36" McNally-Pittsburg Double Roll
1—30" x 45" Jeffrey Single Roll
1—30" x 16" Williams Pulverizer
1—36" x 40" Jeffrey Double Roll
1—36" x 48" Jeffrey Hammermill

TUGGER & SLUSHER HOISTS

2—5 HP Brownie Room Hoists
3—5 HP Sullivan RH single drum Room Hoists
1—7½ HP Sullivan double drum Slusher Hoist
2—10 HP Sullivan 3 drum Slusher Hoist
1—25 HP Sullivan 2 drum Slusher Hoist
1—Ingersoll-Rand Model 1H Air Tugger Hoist
1—Ingersoll-Rand Mod. 6HC Air Tugger Hoist
1—Ingersoll-Rand Model EU Air Tugger Hoist
2—6½ HP Sullivan Single Drum Air Tugger Hoist, 250 Volt DC
7—6½ HP Sullivan Double Drum Slusher Hoist, 250 Volt DC
1—Double Drum Sullivan Slusher Hoist Driven by Continental Gasoline Engine

ELECTRIC HOISTS

1—11 HP Vulcan #0 single drum
1—20 HP Vulcan single drum
1—22 HP Vulcan double drum
1—25 HP Vulcan single drum
1—30 HP Vulcan single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan single drum
1—145 HP Vulcan single drum
2—150 HP Vulcan single drum
1—375 HP Box single drum
1—600 HP Box single drum

BOX CAR LOADERS

2—Ottumwa 20 HP Box car loaders
3—Maniere 22 HP Box car loaders
1—Jeffrey 20 HP Box car loader

MINING MACHINES

2—7B Sullivan super short wall coal cutters
18—CE7 Sullivan coal cutters
1—CR3 Sullivan coal cutter
1—Jeffrey 28A coal cutter
6—Goodman 112-A coal cutters
1—Sullivan CH-11 ironclad shearing machine
1—Jeffrey 29-C Arcwall coal cutter

LOADERS & CONVEYORS

2—8BU Joy loaders
2—61EW Jeffrey elevating chain conveyors
1—61HG Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shaker conveyors
10—G-15 Goodman shaker conveyors
8—Vulcan shaker conveyors
2—Joy ladel UN-17 shaker conveyors
10—Goodman HA duckbills

MINE FANS & BLOWERS

2—8-H Jeffrey 42" Aerodyne Fans
1—Jeffrey 8 x 4 Fan
5—Jeffrey A61 exhaust blowers
8—Jeffrey Aerodyne midget blowers

SCALES

3—100 ton Fairbanks railroad scales
1—100 ton Howe railroad scale
1—125 ton Howe railroad scale
1—5000# Fairbanks Tipple scale with weighing basket
1—5000# Howe Tipple scale

STORAGE BINS

3—50 ton capacity steel bins
2—100 ton capacity steel bins

TIPPLE EQUIPMENT

1—4 deck shaker screen 32' long in 2 sections, driven by 10 HP & 25 HP motors
1—4 deck card shaker screen, 18' long, driven by 50 HP motor
1—Card rotary car dumper
1—Bucket Elevator, 36'6" centers, 18" x 11" x 9" buckets.
1—Bucket Elevator, 45' centers, 6"x4" buckets
1—Bucket Elevator, 48'8" centers, 10" x 6" buckets
1—Jeffrey picking table, 19' centers, 36" wide
1—Jeffrey picking table, 19'8", 36" wide
1—Jeffrey Drag Conveyor, 88'6", 36" flights
1—Jeffrey Drag Conveyor, 72', 30" flights
1—Jeffrey Drag Conveyor, 67', 30" flights
1—Jeffrey Drag Conveyor, 69'6", 28" flights
1—Link Belt Drag Conveyor, 50', 15" flights
1—32" x 9'6" Card vibrating screen
1—4' x 6'6" Link Belt jig washer
1—Loading boom, 32'3" centers, 24" flights with 8' grizzly
1—Loading boom, 55' centers, 48" flights
1—Loading boom, 45' centers, 30" flights
2—Card self dumping mine cages
2—Card 84" bicycle sheave wheels
1—24" Belt conveyor, 40' centers
1—24" Belt conveyor, 13' centers
1—24" Belt conveyor, 135' centers
1—24" Belt conveyor, 66' centers
1—30" Belt conveyor, 173' centers
1—Red Devil egg loader, 16" flights
1—Ottumwa nut loader, 16" belt

ELECTRIC CABLE

1368'—#10 Parkway cable 3/c, 7200 volt
2977'—#8 Parkway cable 3/c, 7200 volt
262'—#8 Parkway cable 3/c, 600 volt
1900'—#6 Parkway cable, 3/c, 7200 volt
970'—#2/0 Parkway cable, 600 volt
2,098'—#6 Tirex cable, 600 volt, 3/c
1417'—#4 Tirex cable, 3/c, 600 volt
547'—#2 Tirex cable, 3/c, 600 volt
1022'—#12 new Tirex cable, 4/c, 600 volt
5250#—300,000 CM stranded w.p. 1/c
14122'—#1/0 stranded r.c., 1/c
16682'—#4 stranded r.c., 1/c
2300'—#4/0 stranded r.c., 1/c
1705#—#4 solid bare
5467#—#2 solid bare
2600#—#1 solid bare
1255#—#1/0 solid bare
2975'—type TTHFA-60 new telephone cable

PIT CARS

160—60 cu. ft. coal mine cars, wooden sides, 42" ga.
125—60 cu. ft. Card steel coal mine cars, 36" ga.
88—66 cu. ft. Card steel coal mine cars, 36" ga.

SHUTTLE CARS

2—Joy Shuttle Cars, Model 42D5.

RAIL

16, 20, 30, 40, 52, 60, and 80# relaying rail in stock

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Goodman 512EJ, 212AA, 112AA, 12AA.
Joy 11B, 7B—Jeffrey 35L, 35B, 35BB, 29L, 29C.
AC and DC current, Rebuilt or as is.

LOCOMOTIVES

Haulage and Gathering, 45 in stock.
All track gauges.
Jeffrey MH-7B, 10 ton, and tandem 20 ton. Jeffrey MH-8B, 6 ton. Also tandem 12 ton. Goodman 6 ton & 8 ton. Westinghouse 4 and 6 ton. Most of the above have motor driven reels.
4, 16, and 20 ton Gas & Diesel Locomotives.

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Mine available, latest types. Rebuilt or as is.
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Jeffrey 61 CLR, like new, on rubber, 24" high. Myers Whaley No. 3 and No. 4. Goodman 660.

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22 units in stock.
Jeffrey 61 AM 12" Room Conveyors.
Jeffrey 61 HG Face Conveyors.
Joy 12" and 15" Conveyors.
Goodmcn 30" x 600' Belt Conveyors.
Goodman G-15 Duck-Bill Units.
Joy UN-17 Shaker Conveyors.
Barber-Greene 24" x 45' portable Belt Conveyors.

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Crushers, 4 in stock. Vibrators, 3 on hand. Loading Booms, Feeders Picking Tables. Also complete Tipples.

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2 Low-pan Cat Trucks, T2-5.
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Shuttle Cars, model 32E and 42E
Car Spotter, new.

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6 in Stock, 200, 150, and 100 KW Rotaries. 150 KW, MG Set. 75 and 100 KW Diesel Plants. All 250 Volt DC

MINE CARS

600 Available. 42", 44" and 48" Ga.
Drop Bottom and End Dump.

TRANSFORMERS

125 in stock. Most sizes and voltages.

MISCELLANEOUS

1 MSA Rock Duster, like new.
6 Jeffrey 35BB, 29L Spare Armatures.
6 Class 21 Jeffrey Starters.
7—8000 Gallon Tank Car Tanks
4000 Five Gallon G. I. Gas & Water Cans
1 Brown Fayro Car Spotting Hoist.
Siren, 5 H. P. 220 volt, 3 phase.
Relaying Rails, 500 tons, 20, 30, 40, 70 and 80 lbs.
Steel Mine Ties, 42" & 48" Ga. 20#, 30#, 40# and 60#.
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35B Jeffrey
12AA, 12AB, Goodman
Universal 50 H.P., Goodman
7 AU Sullivan

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6, 8, 10 Ton Jeffrey
6, 10, 13 Ton G.E.

MINE CARS

100 All Steel, 5 Ton Capacity

All equipment listed is for 42" T. G. and 250 V, D.C.
All sizes A.C. and D.C. Motors.
12 x 12 Centrifugal Recirculating Pump with 125 H.P. Motor.
Rotary Converters, 150, 200, 300 K.W.

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1—150 KW, GE, 275 volt, Type HCC6, Form P, 1200 RPM, 2300/4000 volt transformers. Complete will all manual switch gear and 1200 Amp. Westinghouse automatic reclosing circuit breaker.
1—150 KW, Allis-Chalmers, 275 volt, 1200 RPM, 2300/4000 volt transformers, 1200 Amp. Westinghouse automatic reclosing circuit breaker.

LOCOMOTIVES

2—Jeffrey, MH 121, 4 ton, 24" above rail, electric motor driven reels, now 42" track gauge but will change, inside frames.
1—4 Ton Jeffrey MH96 42" track gauge, completely rebuilt and overhauled, with or without reel.
1—6 Ton Jeffrey MH88 48" track gauge, completely overhauled and rebuilt, with or without reel.

MINING MACHINES

1—Jeffrey, 35B, 6½ ft. cutter bar, Jeffrey cutter chain standard bit, mounted on Special Low Vein trucks. Stands 29" above rail when loaded.
1—Special low vein machine truck, 42" track gauge, but will change.

MISCELLANEOUS

16—Sanford-Day automatic drop bottom mine cars, 17" above rail, 42" gauge.
1—Complete tipple, 4 track, Morrow screens, loading booms, car retarders, boxed with gal. siding, wood construction. A BARGAIN.
1—Jeffrey retarding rope and button conveyor, 800' long. A BARGAIN.
100—tons 30# rail in excellent condition. All straight.
10—30# switches, complete.
2—Deming mine pumps with all bronze heads, size 5x5.
2—Mine fans. 1—Jeffrey 6 ft. 1—7 ft. fan Propeller type, Hartzell.
100—Edison Electric miners' lamps, charging panels.
Electric motors, both DC and AC.

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TOUGH COVERS—heavy duty, specially compounded abrasive resistant rubber covers having high tensile strength. Thoroughly capable of withstanding the abrasive action of bulk materials. Properly vulcanized to the carcass to assure utmost performance, economically.

STRONG CARCASS—Constructed of finest quality 28 and 32 ounce tough cotton duck, properly treated and impregnated to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation.

FLEXIBILITY — Careful attention has been given in the construction of all belts to have the proper flexibility assuring the following desirable features: troughs easily, runs true on all idlers, gouge resistant, excellent for long and short hauls and slope installations.

Avoid delays in your production schedules!

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Width	Ply	Thickness Top Cover	Thickness Bottom Cover	Type of Duck Carcass
8"	4	1/16"	1/32"	28 Oz.
10"	4	1/16"	1/32"	28 Oz.
12"	4	1/16"	1/32"	28 Oz.
14"	4	1/16"	1/32"	28 Oz.
16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
20"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/16"	32 Oz.
30"	5	1/8"	1/16"	32 Oz.
30"	6	1/8"	1/16"	32 Oz.
36"	6	1/8"	1/16"	32 Oz.
42"	5	1/8"	1/16"	32 Oz.
48"	5	1/8"	1/16"	32 Oz.
48"	8	1/8"	1/16"	32 Oz.

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3—75 KVA G. E. Transformers, *4160 to 2400 Volts. Rebuilt.*
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CRUSHERS - VIBRATING SCREENS - TRUCK SCALES

Bonded double roll crushers. For crushing cinders, pumice, perlite and similar materials. Capacities to 100 tons per hour. Steel hoppers included.
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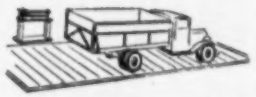
Heavy duty eccentric shaft types; 1 to 5 decks, 3' x 8' to 5' x 14'. Others from 2' x 4'. Wire cloth or plate included to your specifications.
Priced from $431.00



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Others to 50 ton capacity. All scales complete with structural steel. Parts and weighing beams for most makes of motor truck scales.

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Mobile Tire-Mounted Drag Chain Conveyor

Mounted on rubber tires and adjustable undercarriage. All welded steel; double guided heavy duty chain; steel flights. Electric or gasoline power.
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Vertical & Inclined Bucket Elevators, spaced or continuous buckets, mounted on chain or belt. Because of the wide variety of sizes & types, prices will be furnished on request.

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Any length. Flights up to 8" x 24". All welded structural and sheet steel. Heavy duty, double guided chain.
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Troughing idler conveyors—picking tables. Any length. Belt widths to 60". All steel idlers. Replaceable ball bearings.
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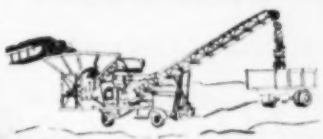

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Ready-Made Head, Tail and Intermediate Conveyor Sections
All Types Idlers, Return Rolls and Belting in Stock

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Priced from—$171.00

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Roll Idler
$6.38

Self-Aligning Idler
$56.50

Guide Idler
$13.75

Wing Pulley
$64.00

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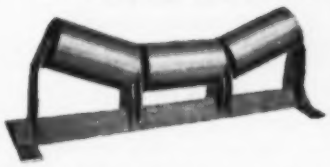

3-roll Troughing Idlers for these sizes:

14" belt	$16.50	30" belt	$19.50
16" belt	17.25	36" belt	20.25
18" belt	18.00	42" belt	21.00
24" belt	18.75	48" belt	21.75

1-roll Return Idlers for these sizes:

14" belt	$6.38	30" belt	$8.25
16" belt	6.75	36" belt	8.75
18" belt	7.13	42" belt	9.50
24" belt	7.50	48" belt	10.25

All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Rust-proof ball races; maintenance is negligible.

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H.P.	Winding	RPM	List Price	Sale Price
3	Comp & Shunt	1750	$276.19	$100.00
5	Shunt	1750	438.95	165.00
7½	Comp.	1750	536.19	195.00
*7½	Comp.	1200	700.00	225.00
15	Comp.	1150	937.00	380.00

*This is a Marine type motor with shaft on both ends.

CONVEYOR BELTING
Famous brands at deep cut prices.

Width	Ply	Top Cover	Bottom Cover	Duck Carcass	Price
18"	4	1/16"	1/32"	28 oz.	2.50/ft.
24"	4	1/16"	1/32"	28 oz.	3.23/ft.
30"	4	1/16"	1/32"	28 oz.	3.97/ft.
36"	4	1/16"	1/32"	28 oz.	4.70/ft.
48"	4	1/16"	1/32"	28 oz.	6.16/ft.

Stock Models of All Types for Immediate Shipment—Special and Unusual Conveyors Built to Order—Complete Systems Designed, Engineered and Manufactured.

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1—500 KW G.E. Syn. 275 V. 900 RPM
1—500 KW WEST. Syn. 275 V. 900 RPM
2—300 KW G.E. Syn. 275 V. 1200 RPM
2—300 KW WEST. Syn. 275 V. 1200 RPM
1—200 KW G.E. Syn. 275 V. 1200 RPM
1—200 KW RIDGWAY Syn. 275 V. 900 RPM
1—150 KW G.E. Syn. 275 V. 1200 RPM

ROTARY CONVERTERS

2—600 KW G.E. Syn. 275 V. 1200 RPM
1—300 KW G.E. Syn. 275 V. 1200 RPM
1—300 KW WEST. Syn. 275 V. 1200 RPM
1—200 KW WEST. Syn. 275 V. 1200 RPM
1—150 KW G.E. Syn. 275 V. 1200 RPM

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1—300 KW WEST. Sealed-Ignitron Rectifier Mining Stationary Type, 275 V. DC. Complete with AC and DC Switchgear Cubicles. Main 354 KVA Rectifier Transformer 13,200/4160/2300 V. AC and all Accessories.

LOCOMOTIVES

2—30 T JEFFREY 250 V. 3-MH-77 48-36" Ga.
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1—20 T G.E. 250 V. (Tandem) HM-809 36" Ga.
1—15 T GOODMAN 250 V. 81 Mts. 44-36" Ga.
1—13 T JEFFREY 250 V. MH-110 44-36" Ga.
1—13 T JEFFREY 500 V. MH-110 44-36" Ga.
1—10 T JEFFREY 250 V. MH-2110 48-36" Ga.
2—10 T JEFFREY 250 V. MH-110 42-36" Ga.
1—10 T WEST. 250 V. ML-907-C 36" Ga.
2—10 T GOODMAN 250 V. 36-B 36" Ga.
2— 8 T JEFFREY 250 V. MH-100 42-36" Ga.
2— 8 T WEST. 250 V. ML-906-C 44-36" Ga.
1— 8 T WEST. 250 V. ML-925-L 30-24" Ga.
2— 6 T JEFFREY 250 V. MH-88 44-36" Ga.

LOCOMOTIVE MOTORS

4—JEFFREY 250 V. MH-77, Ball Bearing
2—WEST. 250 V. ML-908-C, Ball Bearing
2—WEST. 250 V. ML-906-C, Ball Bearing
2—G.E. 500/250 V. HM-824-A, Ball Bearing
4—WEST. 80 V. V-49-X, Ball Bearing
Extra Armatures Available for Above Motors

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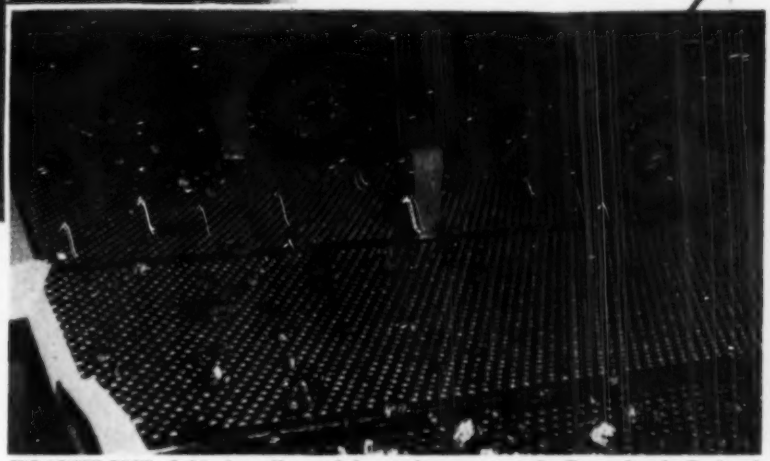
This index is published as a convenience to the reader. Every care is taken to make it accurate, but C. A. assumes no responsibility for errors or omissions.

163,125 tons of wet coal

over these Stainless Steel screens

-and they're ready for still more service!



THE LOWER DECK of this desanding and dewatering screen at the Pennsylvania Coal and Coke Corporation's Ehrenfeld plant is made up of 16 Stainless Steel screens. The inset shows one of the screens, all of which have been in service nearly a year.

THE 16 screens on the lower deck of this desanding and dewatering unit at the Ehrenfeld preparation plant of Pennsylvania Coal and Coke Corporation have handled 163,125 tons of wet coal in nearly a year of service. They're made of U·S·S Stainless Steel.

The long life to date—twice the service expected from ordinary screens—is outstanding in itself. But the screens are still in good condition, and preparation plant officials expect another six months to a year of wear.

The screens—36" x 32½"—are 16-gage plate with ⅛" round holes. They handle 45 tons per hour and are in service 72½ hours each week. To equalize wear, their positions are reversed every three months.

This is the kind of performance you can expect from Stainless Steel screens—and from the many other applications of Stainless in the preparation plant. Although its original cost is higher than other materials you can use, its long service life and freedom from maintenance make it cost you far less in the long run.

Get the full story of how one big preparation plant has made extensive savings with Stainless Steel by writing for our book, "Stainless Steel at Sunnyhill." Send your request to United States Steel Corporation, Room 2813-Q, 525 William Penn Place, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS

3-421

UNITED STATES STEEL

ONLY $75 FOR ENGINE REPAIRS IN 11 LONG YEARS!

That's the record reported by the Sunnyhill Coal Co., New Lexington, Ohio, for its Caterpillar D17000 Diesel Engine. And quite a record it is, because the engine works hard 14½ hours a day all year long, powering a Whitcomb (Baldwin-Lima-Hamilton) 30-ton locomotive. The locomotive removes and replaces hopper cars at the company's No. 8 washing plant; it handles 21 empty hoppers, or eight to ten fully-loaded 50-ton hoppers.

Sunnyhill has lots of other Cat* equipment, too, including eight husky D8 Tractors and another D17000 Engine in a Manitowoc shovel.

Caterpillar offers 12 sizes of engines and electric sets ranging up to 500 HP and 315 KW. They are tailor-made for coal-handling equipment. Leading manufacturers can furnish Cat Diesels in their machines. Specify *Caterpillar* on your machinery order.

And call your nearby Caterpillar Dealer. His experience can help you on your re-powering problems. Ask him to show you the efficient service facilities that stand ready to serve you.

CATERPILLAR, Peoria, Illinois.

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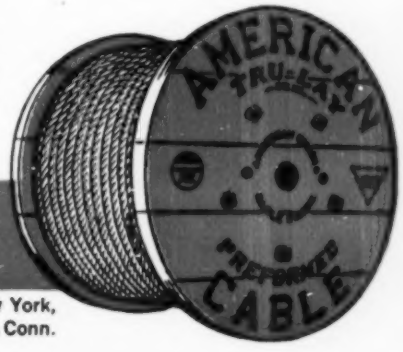

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AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

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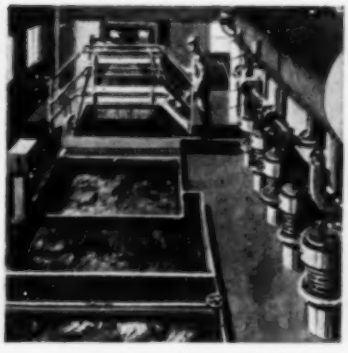
The Inland Steel, Price, Ky., preparation plant built by Link-Belt provides low-cost mechanical ash removal.

Here's what it means to you when LINK-BELT accepts total responsibility

OVERALL ENGINEERING. Vast experience of nation-wide design and field engineering staff integrates all factors, assures expert planning.



QUALITY EQUIPMENT. Link-Belt itself builds a broad line of coal preparation, handling and power transmitting equipment.

COMPLETE ERECTION. Experienced erection superintendents, staffs and skilled crews carry through entire job down to last detail.

SATISFACTORY PERFORMANCE. When you rely on Link-Belt as a single source, Link-Belt accepts responsibility for overall operation.

Inland Steel reduces ash content of raw coal

WHEN Inland Steel wanted a new plant at Price, Ky., for the efficient preparation of metallurgical coal—they turned the job over to Link-Belt. From the modern buildings that house the equipment—to mine car dumping, coal cleaning, coal handling and refuse disposal machinery—it's Link-Belt all the way.

Today Inland Steel processes 750 tph of raw coal. Equally important, the new plant permits "full seam" mining. Extracting coal in areas formerly uneconomical steps up ton-per-man production permitting recovery of a larger per cent of the deposit.

Find out how you can utilize Link-Belt's total responsibility. On small jobs as well as large, an engineer in the Link-Belt office near you will be glad to demonstrate how Link-Belt's vast resources can serve you.

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COAL PREPARATION and HANDLING EQUIPMENT